The Chemical Age

VOL. LXII 28 JANUARY 1950 No 1594

PUBLIC LIBRARY
FEB 17 1950
DETROIT

DORR-OLIVER

AGITATORS, CLASSIFIERS, FILTERS, SAND-WASHERS, SLAKERS, THICKENERS, etc., etc., and the A. R. WILFLEY & SONS CENTRIFUGAL SAND and ACID PUMPS HAVE BEEN USED

for Over 40 Years

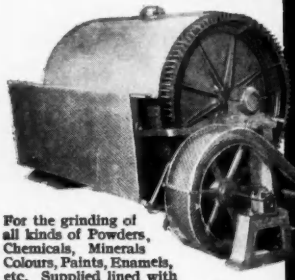
by PRODUCERS OF
Alum, Alumina, Caustic Soda, Cement, China Clay, Flue Dust, Glass Sand, Pigments, Barytes Chemicals, Pulp and Paper, Fertilizers, Petroleum, Sugar and many other materials.

Why not
Submit your Problems to us?

DORR-OLIVER CO. LTD.
ABFORD HOUSE · WILTON ROAD · LONDON, S.W.1

STEELE-SHAW

PEBBLE MILLS



For the grinding of all kinds of Powders, Chemicals, Minerals Colours, Paints, Enamels, etc. Supplied lined with hard Porcelain, Silex, or special linings, and can be insulated to suit particular classes of work.

Send for our free illustrated literature

STEELE & COWLISHAW, LTD.,
Engineers (Dept. No. 12)
Head Office and Works:
COOPER STREET, HANLEY, STOKE-ON-TRENT,
London Office: 329, High Holborn, W.C.1
Telephone: Holborn 6023.

Nearly ½ a Century's Experience in Grinding

NEGRETTI & ZAMBRA
LIMITED
122, Regent St., London, W.1. Reg. 3406

• • •

MANUFACTURERS OF
Industrial Instruments for
Indicating, Recording and Controlling Temperature, Pressure, Humidity, Volume.

Also Manufacturers of Meteorological and Aeronautical Instruments

Send for our Bulletin B/19 which gives a brief summary of our instrument range.

• • •

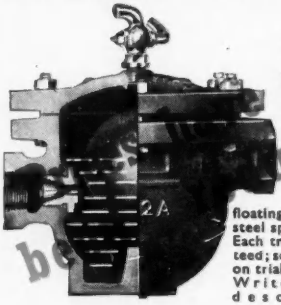
BRANCHES:—Birmingham, Cardiff, Glasgow, Leeds, Manchester, Nottingham.
Agents in most countries overseas.

CRUICKSHANK'S

CYANIDES of
CADMIUM
COPPER
GOLD
NICKEL
POTASSIUM
SILVER
SODIUM
ZINC

R. CRUICKSHANK, LTD.
Camden Street, Birmingham, 1
Telephone: B'ham Central 8553 (6 lines)
Telegrams & Cables: Cruickshank Birmingham

"Simplicity" STEAM TRAPS



cannot jam or blow steam. Unique in design, foolproof in operation. "Simplicity" Steam Traps have only one moving part—a free floating stainless steel sphere. Each trap is guaranteed; send for a trap on trial. Write for fully descriptive pamphlet.

Agents and Stockists in many countries, the names of whom we will gladly send on application.

THE KEY ENGINEERING CO., LTD.
4 QUEEN VICTORIA STREET, LONDON, E.C.4
and TRAFFORD PARK, MANCHESTER.
Telephone: CITY 1185/6. TRAFFORD PARK 1903.

NASH HYTOR VACUUM PUMPS AND COMPRESSORS

FOR THE CHEMICAL AND ALLIED INDUSTRIES

Many entirely new problems have been solved successfully since 1939; we might also help you with our acquired experience if you communicate with

NORMAN ENGINEERING COMPANY

BRITISH AGENTS AND SERVICE ENGINEERS FOR

NASH ENGINEERING Co (GREAT BRITAIN) LTD.

HYTOR WORKS, COMMERCE WAY, PURLEY WAY,

CROYDON

Telephone : CROYDON, 2278/9

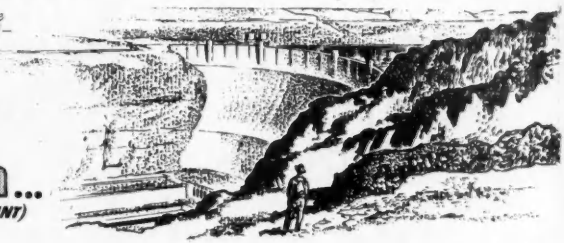
Telegrams : "NASHNORMA", CROYDON

There are no substitutes for
GRADUATED GLASSWARE
TOWERS
& STREAMLINE HYDROMETERS
OF GUARANTEED ACCURACY
Every article is re-tested, well annealed and may be depended upon. The best quality available is always the most economical—and particularly when reasonably priced and backed by the manufacturer's guarantee of accuracy.
Towers Streamline Hydrometers are available in all types including Specific Gravity, Density, B.S.S., Baumé, Brix, Twaddell, J.P., A.S.T.M., S.T.P.T.C., etc.
Your enquiries are invited.
J. W. TOWERS & CO. LTD.
FOR ALL SCIENTIFIC LABORATORY EQUIPMENT
Head Office and Works: WIDNES, LANCASHIRE (Widnes 2201)
MANCHESTER
44 Chapel St., Salford 3
LIVERPOOL
134 Brownlow Hill, Liverpool 3
STOCKTON-ON-TEES
28 Bridge Road

A Good Dam AND A Bad Dam...

(HOLDING BACK THE BEST OF THE PAINT)

The Boulder Dam — holds back the largest artificial lake in the world — 115 miles long and 40 miles wide



and a **Jolly Good Drum**

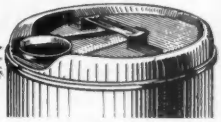
WITH NO "DAM" INTERRUPTION

BROUGH'S K·C·C DRUMS

E. A. BROUGH & CO. LTD.
Liverpool & Speke

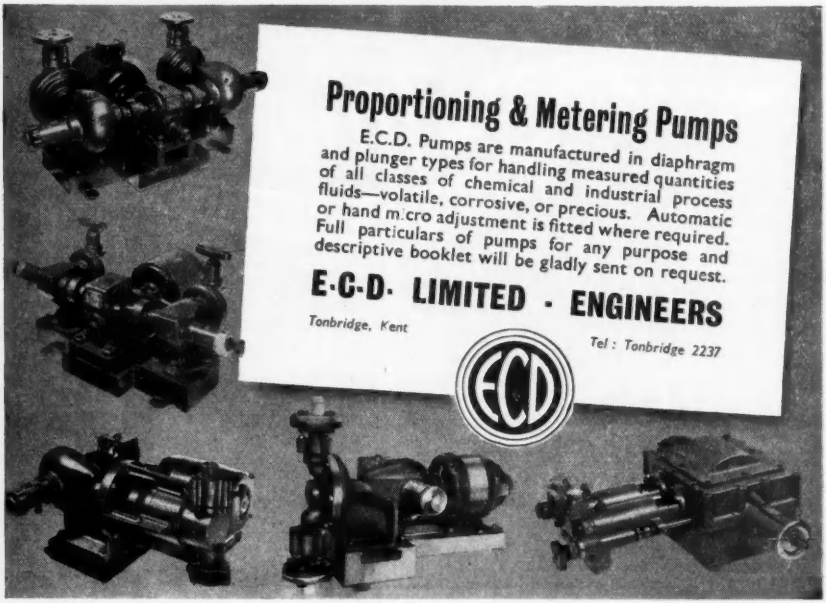
Invariably when paint is conveyed in old-style containers, the best paint is left behind, i.e., the "cream" of the paint is wasted.

Avoid this waste. Use BROUGH'S K.C.C. DRUMS—the drums that pour without interruption of flow to the last drop—and thus ensure your customers getting the same consistency of paint as your original sample.



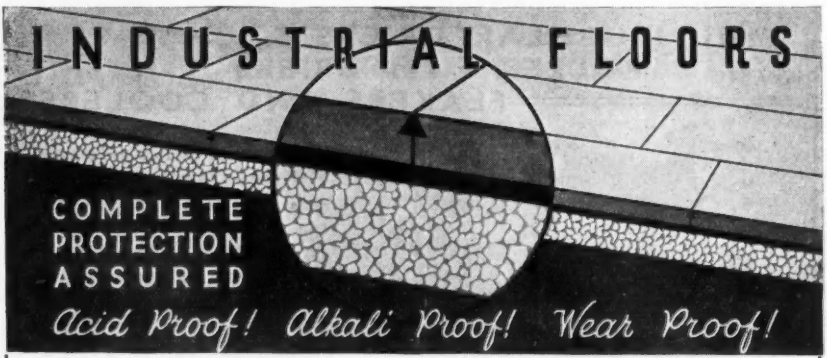
NOT ONLY **STIR WELL** BUT **POUR WELL** WITH **BROUGH'S K.C.C. DRUMS**

NEW DESIGN · PATENTED DESIGN REGD.


Proportioning & Metering Pumps
E.C.D. Pumps are manufactured in diaphragm and plunger types for handling measured quantities of all classes of chemical and industrial process fluids—volatile, corrosive, or precious. Automatic or hand micro adjustment is fitted where required. Full particulars of pumps for any purpose and descriptive booklet will be gladly sent on request.
E·C·D· LIMITED · ENGINEERS
Tonbridge, Kent
Tel: Tonbridge 2237
ECD

INDEX TO ADVERTISERS IN THIS ISSUE

	Page
Associated Lead Manufacturers, Ltd.	ix
Bamag, Ltd.	xvii
Blackwell's Metallurgical Works, Ltd.	xxi
Bowmans Chemicals, Ltd.	xxii
Boydell, E., & Co., Ltd.	vi
British Acheson Electrodes, Ltd.	Cover iv
Brough, E. A., & Co., Ltd.	ii
Classified Advertisements	xviii, xix, xx & xxvi
Cruickshank, R., Ltd.	Cover ii
Dorr-Oliver & Co., Ltd.	Front Cover
E.C.D., Ltd.	ii
Elliott, H. J., Ltd.	xvi
Essex Aero, Ltd.	v
Fielding, T. H., & Sons, Ltd.	xxii
Girling, S., & Sons (Coopers), Ltd.	vi
Harris, Francis W., & Co., Ltd.	xxii
Haughton's Metallic Co., Ltd.	xxii
Haworth, F., (A.R.C.), Ltd.	iii
Imperial Chemical Industries, Ltd.	xv
International Pulverisers, Ltd.	Cover iii
Jobling, James A., & Co., Ltd.	vi & xxi
Jones, Tate & Co., Ltd.	x
Kestner Evaporator & Engineering Co., Ltd.	vi & xvi
Key Engineering Co., Ltd. (The)	Cover ii
Laporte Chemicals, Ltd.	xii
Leigh & Sons Metal Works	xxii
Lennox Foundry Co., Ltd.	xxii
Manesty Machines, Ltd.	xii
Metropolitan-Vickers Electrical Co., Ltd.	Cover iv
Mirrlees Watson Co., Ltd. (The)	viii
National Coal Board	iv
Negretti & Zambra, Ltd.	Cover ii
Norman Engineering Co.	i
Orr, George W., & Co., Ltd.	Cover iii
Paget, R. F.	xix
Perry & Hope, Ltd.	xxi
Philips Electrical, Ltd.	xiii
Power-Gas Corporation, Ltd. (The)	xi
Robinson Brothers, Ltd.	Cover iii
Robinson, L., & Co. (Gillingham), Ltd.	xiv
Sarco Thermostats, Ltd.	viii
Simon, Richard, & Sons, Ltd.	iv
Spence, Peter, & Sons, Ltd	x
Steele & Cowlishaw, Ltd.	Cover ii
Steele, G. W., & Co.	xxii
Towers, J. W., & Co. Ltd.	i
Tretol, Ltd.	Cover iii
Trevis Smith, Thos., Ltd.	xxii
Widnes Foundry & Engineering Co., Ltd.	vii
Wilkinson, James, & Son, Ltd.	xiv



Highly resistant to oils, fats and greases. Unaffected by strong soaps and solvents. Will withstand alternating heat and cold. Completely waterproof. The ideal floor for all chemical plants.

F. HAWORTH (A.R.C.) LTD.

SQUARE STREET, RAMSBOTTOM, LANCS.

Telephone: RAMSBOTTOM 3254 *Telegrams:* "CEMENTS, RAMSBOTTOM"

THE NATIONAL COAL BOARD ARE PRODUCERS OF

WITHERITE

(MINERAL BARIUM CARBONATE)

IN ALL GRADES

LUMPS, NUTS, PEAS & FINES — 90–94% $BaCO_3$

AIR-FLOATED WITHERITE — 93–95% $BaCO_3$
(CONFORMING TO B.S.S. No. 926-1940 — EXTENDERS FOR PAINTS)

PULVERISED WITHERITE — 92–95% $BaCO_3$
(GLASSMAKERS AND OTHER GRADES)

ALSO

BARIUM CHLORIDE

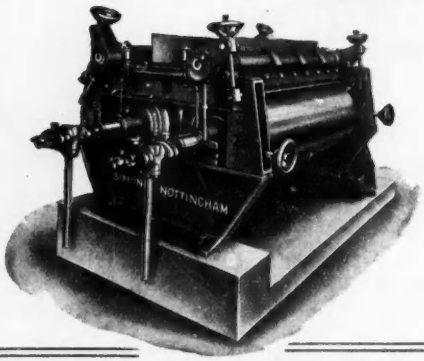
(COMMERCIAL CRYSTALS :— 98-100% $BaCl_2 . 2H_2O$)

INQUIRIES SHOULD BE ADDRESSED TO :—

AREA MARKETING MANAGER, No. 6 AREA, NORTHERN DIVISION,
NATIONAL COAL BOARD,
"D" FLOOR, MILBURN HOUSE,
NEWCASTLE ON TYNE, 1

TELEGRAMS, "SIXAREA" NEWCASTLE ON TYNE TELEPHONE NO. NEWCASTLE 26161 (PRIVATE EXCHANGE) 21471, 21472, 21473

MULTITUBULAR DRIERS
ROLLER FILM DRIERS
FLAKERS AND COOLERS



We offer accumulated experience of 50 years' specialization.

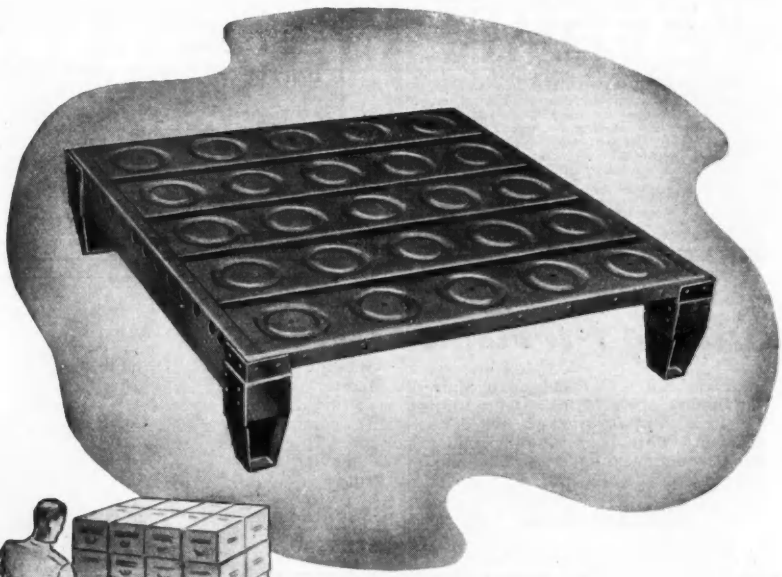
OUR WORKS, the largest in the United Kingdom devoted especially to DRYING MACHINERY, are laid out and equipped with the latest plant for this particular purpose.

MANY STANDARD SIZES including LABORATORY MODELS.

We have test plants always available

RICHARD SIMON & SONS, LTD.

PHŒNIX WORKS, BASFORD, NOTTINGHAM



This NEW development in Stillage PLATFORMS

has brought the science of "lightness plus strength" to Mechanical Handling. Light and ultra-light metal construction has reduced "dead weight" to such a degree that our platforms are only *half the weight* of a similar size in timber, yet able to support loads far in excess of normal requirements.

Our successful designs have been governed by—"Will they stand shock of impact?" — "Have they long life?" — "Are they impervious to rot?" — Yes! Yes! Yes!

Exhaustive tests in factories throughout the country have proved the durability of this latest advance in handling equipment.

Hygenic; non-splintering; unaffected by weather.

SAVES cost!
SAVES time!
SAVES labour!

Weighs 28 lb
Supports 30 cwt

MADE IN ALL STANDARD SIZES

Please write for illustrated Brochure

Manufactured and distributed by **ESSEX AERO LTD** GRAVESEND KENT

KEEBUSH

Keebush is an acid-resisting constructional material used for the construction of tanks, pumps, pipes, valves, fans, etc. It is completely inert to most commercial acids; is unaffected by temperatures up to 130°C; possesses a relatively high mechanical strength, and is unaffected by thermal shock. It is being used in most industries where acids are also being used. Write for particulars to—

KESTNER'S

5 Grosvenor Gardens, London, S.W.1

S. GIRLING & SONS,
(COOPERS) LTD.
Barrel & Drum Merchants

STEEL DRUMS RECONDITIONED BY US
SPEEDY DELIVERIES
Suitable for all Trades

Office and Cooperage:
59 LEA BRIDGE ROAD, LEYTON, E.10
Tel: Leytonstone 3852

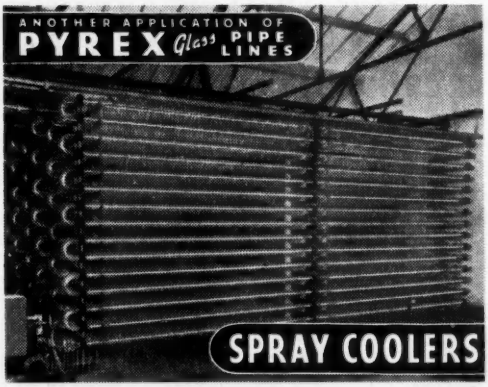
Siding Problems SOLVED

Compact enough to manoeuvre easily, the Muir-Hill Shunter is sufficiently powerful to handle 100 tons on straight, level rail. Independent of track, it has small running costs and there is no standing time to pay for. The most economical and mobile means of moving railway-trucks. Illustrated brochure on request.

The **Muir-Hill** MODEL 100 *Shunter*

E. BOYDELL & CO. LTD., MANCHESTER, 16
Tel.: Trafford Park 1641 *Grams: "Muirhil" Manchester*

dmEB 165



Extracting 600,000 B.T.U.s per hour, Mean Temperature difference 6·5° F.

THE spray cooling installation here shown is made up from PYREX Brand standard Glass Pipes and return bends, and is extracting 600,000 B.T.U.s per hour with only 6·5°F. mean temperature difference, from weak Hydrochloric Acid.

Although our customers' staff had no previous experience of handling PYREX Brand Pipe Lines, they erected the whole of this complex installation without one breakage. Further, no glass pipe replacements have been found necessary during the first nine months of use.

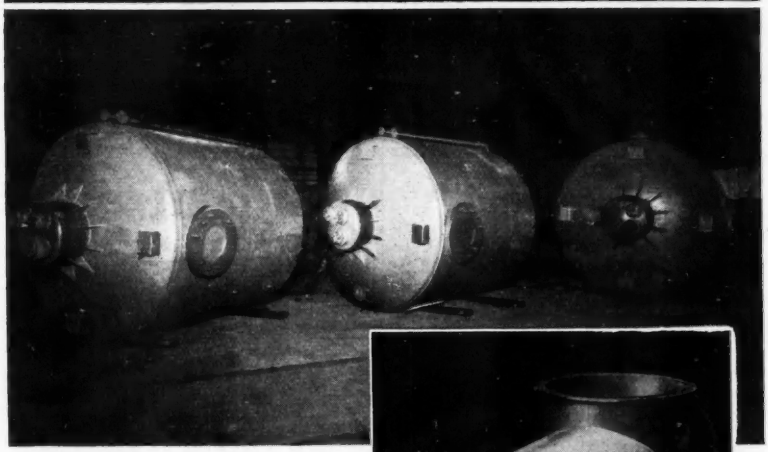
Let our technicians advise you how PYREX Brand Glass Pipe Lines can be adapted to your particular needs.

Write for catalogue and full details.

PYREX *Glass* **PIPE LINES**
REG° TRADE MARK BRAND

Made by P 90 A
JAMES A. JOBLING & CO. LTD., Dept. 28, Wear Glass Works, SUNDERLAND.

FABRICATION IN STEEL



The engineering service offered by **WIDNES FOUNDRY** includes fabrication in mild and stainless steels of specialised plant and equipment for the chemical, gas, oil, and allied industries. The fabrication of Coolers, Condensers, Storage Tanks and similar constructional work is the logical parallel to production of special purpose castings for the industries mentioned. In foundry work and in fabrication in steel **WIDNES** offer a skilful, comprehensive service to industry

1. The upper illustration shows FABRICATED MILD STEEL VISCOSE KETTLES, 7 ft. 1 in diameter by 7 ft. deep on straight.

2. The inset illustration shows a 4 ft. 0 in. diameter MILD STEEL BRANCH PIPE, 10 ft. 9 in. in length.

WIDNES FOUNDRY & ENGINEERING

TELEPHONE WIDNES 2251(6LINES) CO. LTD TELEGRAMS FOUNDRY WIDNES

LUGSDALE ROAD · WIDNES · LANCS

London Office: BRETTENHAM HOUSE, LANCASTER PLACE, STRAND, W.C.2.

W/6

Special Ejector Air Pumps for Vacuum Production

TO meet the needs of a section of the Chemical Industry requiring Steam-operated Ejectors to maintain vacuum in processes generating gases which attack most common engineering metals, THE MIRRLEES WATSON COMPANY developed some years ago an Ejector of special construction to handle these gases, and having the parts in contact with the gases made from chemically inert carbon.

THIS TYPE OF EJECTOR HAS PROVED TO BE MOST SUCCESSFUL IN OPERATION, AND WE SHALL BE PLEASED TO SEND A COPY OF OUR FOLDER DESCRIBING THE EQUIPMENT TO MANUFACTURING CHEMISTS WHO ARE INTERESTED.

Ask also for information on other types of Ejectors which we manufacture. We can supply them to depress the pressures in process systems to one millimetre absolute.

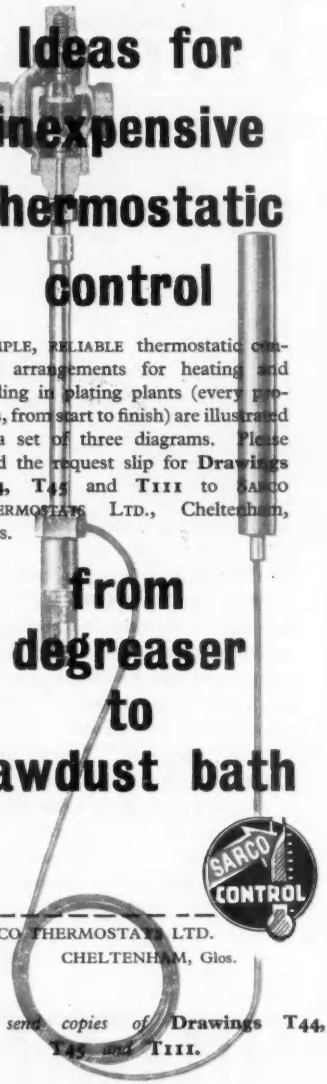
We also manufacture Reciprocating and ROTARY AIR PUMPS. These have their Special Applications.

MIRRLEES WATSON COMPANY LIMITED
SCOTLAND ST. GLASGOW, C.5.

Ideas for inexpensive thermostatic control

SIMPLE, RELIABLE thermostatic control arrangements for heating and cooling in plating plants (every process, from start to finish) are illustrated in a set of three diagrams. Please send the request slip for **Drawings T44, T45** and **T111** to SARCO THERMOSTATS LTD., Cheltenham, Glos.

from degreaser to sawdust bath



To SARCO THERMOSTATS LTD.
CHELTENHAM, Glos.

Please send copies of **Drawings T44, T45** *and* **T111.**

NAME.....

ADDRESS.....

R 150

ASSOCIATED LEAD

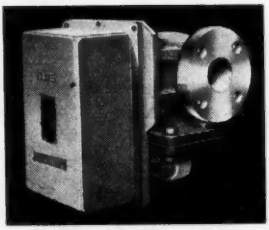
MANUFACTURERS LIMITED

Ibex House, Minories, EC3 · Crescent House · Lead Works Lane,

LONDON · NEWCASTLE · CHESTER

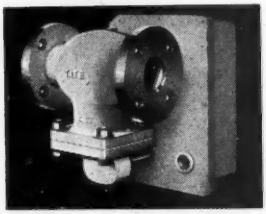
ASSOCIATED LEAD PRODUCTS

TATE SOLENOID-OPERATED SEMI-BALANCED VALVES



RANGE:
½" to 4" bore
5lbs. to 200 lbs/□"
PRESSURE
TOTALLY-ENCLOSED

Also available:
WEATHERPROOF &
FLAMEPROOF



For use on:
STEAM, WATER, AIR, SPIRITS, OIL,
AND CHEMICALS.

TELEPHONE:
BRADFORD 28348/9

TELEGRAMS:
VALVE, BRADFORD

JONES, TATE & Co., Ltd.
VICTORY WORKS BRADFORD.

TO FIRMS WITH **Effluent problems**

PETER SPENCE & SONS LTD RECOMMEND THE USE OF **Aluminium Sulphate**

WHICH REDUCES THE TROUBLESOME FINELY DIVIDED SUSPENDED SOLIDS AND THE "OXYGEN ABSORBED" FIGURES. *Typical examples are:*

A Bleach Works
Effluent before treatment O.A. . 150 parts per 10⁵
Effluent AFTER treatment O.A. . 48 parts per 10⁵

A Tannery
Effluent before treatment O.A. . 74·8 parts per 10⁵
Suspended solids . 788·2 parts per 10⁵
Effluent AFTER treatment O.A. . 16·2 parts per 10⁵
Suspended solids . 2·4 parts per 10⁵

A Food Factory
Effluent before treatment O.A. . 67 parts per 10⁵
Effluent AFTER treatment O.A. . 20 parts per 10⁵

PETER SPENCE & SONS LTD
NATIONAL BUILDINGS, MANCHESTER 3

CHEMICAL AND GAS ENGINEERING CONTRACTORS

SPECIALISTS IN DESIGN AND MANUFACTURE OF COMPLETE PROCESS PLANT & EQUIPMENT FOR

- PRODUCTION, COOLING AND PURIFICATION OF INDUSTRIAL GASES
- WATER GAS, PRODUCER GAS, HYDROGEN
- CATALYTIC PROCESSING OF GASES
- REFINING AND HYDROGENATION OF OILS AND FATS producing EDIBLE AND INDUSTRIAL OILS, HARDENED FATS, VEGETABLE GHEE, FATTY ACIDS, GLYCERINE
- CALCINATION OF LIMESTONE, DOLOMITE, AND MAGNESITE
- CAUSTIC SODA BY ELECTROLYSIS
- SULPHURIC ACID
- AMMONIA AND METHANOL SYNTHESIS
- AMMONIUM SULPHATE AND NITRATE
- DUST AND FUME CONTROL AND RECOVERY
- INDUSTRIAL CRYSTALLIZATION

Although specializing in the above plants we are fully equipped to undertake other new and original projects.

We are prepared to collaborate in design and specifications of plants planned by clients right through to manufacture, erection and putting to work.

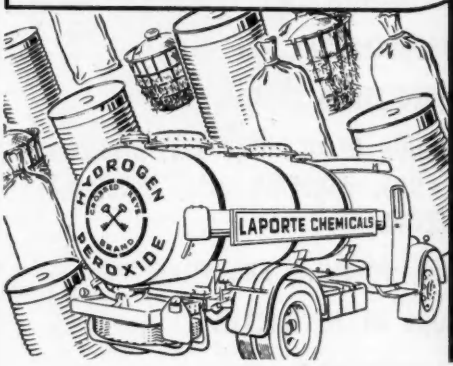
Illustrated bulletins describing the various types of plants available on request.

THE POWER-GAS CORPORATION LTD

STOCKTON PGC -ON-TEES

AND LONDON, AUSTRALIA, CANADA, INDIA, SOUTH AFRICA

LAPORTE Chemicals



HYDROGEN PEROXIDE

PEROXYGEN COMPOUNDS
including:
Sodium Percarbonate
Sodium Perborate.
Urea Hydrogen Peroxide
Persulphates
Benzoyl Peroxide and other
Organic Peroxides

BARIUM COMPOUNDS
including:
Blanc Fixe
Barium Carbonate Precipitated
Barium Chloride
Barium Hydrate

Sodium Sulphide
Sulphated Fatty Alcohols
Sodium Metasilicate
Alkaline Cleaners

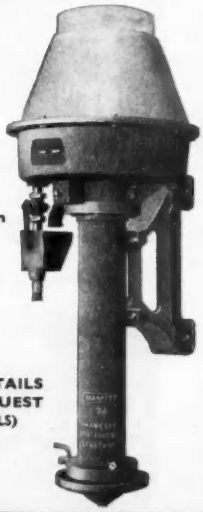
LAPORTE CHEMICALS LTD., LUTON
Telephone: Luton 4390. Telegrams: Laporte Luton

MANESTY
BRITISH MADE

AUTOMATIC WATER STILLS

"Destil" Electric output 2 pints per hour

"OB" Gas output 3 pints per hour



No. 2A Steam output 8 gallons per hour

HIGH QUALITY DISTILLED WATER AT LOW COST

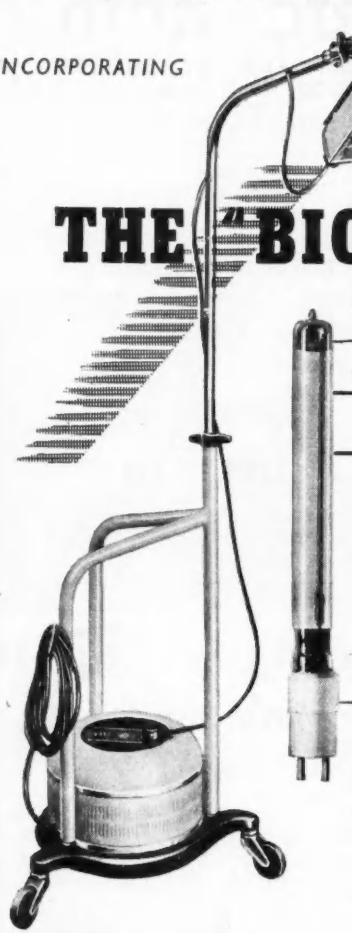
FULL DETAILS ON REQUEST (13 MODELS)

MANESTY MACHINES LTD
Dept. 6, Speke, LIVERPOOL, 19
Telegrams: "MANESTY" LIVERPOOL
Telephone: HUNTS CROSS 1972

ULTRA VIOLET FOR INDUSTRY

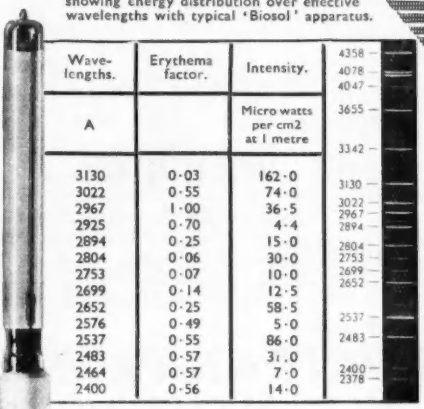
INCORPORATING

THE "BIOSOL" BURNER



SPECTRAL intensity graph and table showing energy distribution over effective wavelengths with typical 'Biosol' apparatus.

Wave-lengths.	Erythema factor.	Intensity.
A		Micro watts per cm2 at 1 metre
3130	0·03	162·0
3022	0·55	74·0
2967	1·00	36·5
2925	0·70	4·4
2894	0·25	15·0
2804	0·06	30·0
2753	0·07	10·0
2699	0·14	12·5
2652	0·25	58·5
2576	0·49	5·0
2537	0·55	86·0
2483	0·57	31·0
2464	0·57	7·0
2400	0·56	14·0



The outstanding irradiation unit, illustrated above, has for many years proved itself in the field of medical therapy. It incorporates the 'B' type "BIOSOL" Burner which, as is well known, is a rich and powerful source of ultra violet radiation. The tube is made of pure transparent fused silica and the emission spectrum extends from the infra-red region down to the lowest limit of transmission through quartz—1,850 AU. When used in conjunction with the special reflector its output is increased approximately 8 times. Moreover, the intensity remains remarkably uniform throughout the life of the burner, ensuring accurate dosage.

★ ***We are happy to announce that the benefits of this important tool have now been extended to industry, through the medium of a compact industrial unit, specifically designed for such processes as vitaminization, sterilization, wine ageing, etc. Available now. Write for full details.***

PHILIPS

PHILIPS ELECTRICAL

LIMITED

X-RAY DEPARTMENT, CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2

(XP571A)

HYDROFLUORIC ACID

ANHYDROUS AND SOLUTIONS ALL STRENGTHS
ALSO PURE REDISTILLED 40% w/w

FLUORIDES, Neutral
Sodium, Magnesium, Barium, Potassium, Lead, Zinc, Ammonium, Aluminium, Lithium, Chromium.

BiFluorides (Acid)
Ammonium, Sodium, Potassium.

Double Fluorides (Cryolites)
Sodium HexafluoAluminate
Potassium HexafluoAluminate

SILICOFLUORIDES
Magnesium, Zinc, Ammonium, Barium, Potassium, Lead, Hydrofluosilicic Acid.

BOROFLUORIDES
Sodium, Potassium, Ammonium, Lead, Copper, Zinc, Cadmium, Fluoboric Acid Solution.

OTHER FLUORIDES TO SPECIFICATIONS.
Glass Etching Acids
Ammonia White Acid and VITROGRAPHINE.

JAMES WILKINSON & SON, LTD.

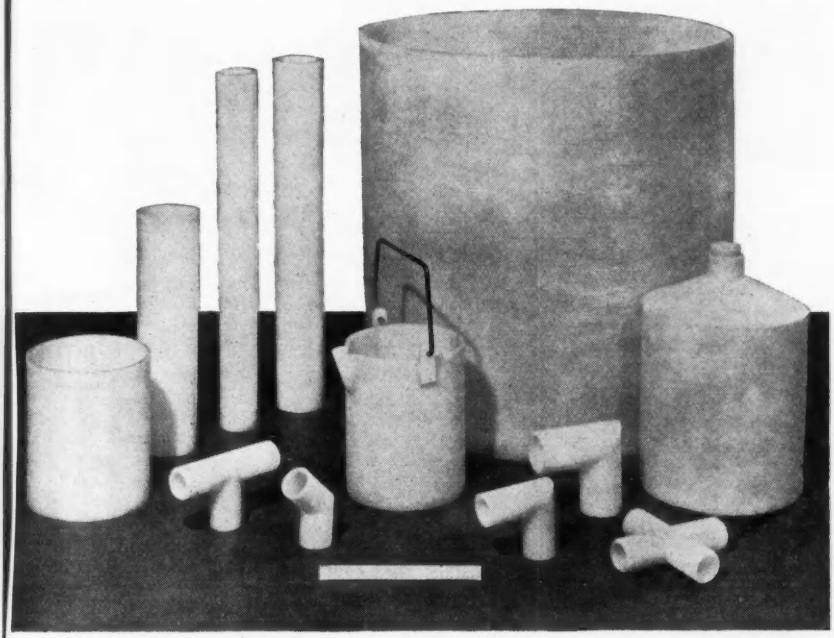
TINSLEY PARK ROAD, SHEFFIELD, 9
'Phone 41208/9 'Grams "CHEMICALS" Sheffield

Jubilee **PATENTED WORM DRIVE CLIP**
the finest CLIP in the world

Absolutely leakproof joints on Air, Water, and Oil lines, are swiftly and easily made by using "Jubilee" Worm Drive Clips. They stand up to any pressure.

★ *Write for details quoting reference RG/12.*

L. ROBINSON & CO., (GILLINGHAM) LTD.
Gillingham Kent



light, tough, chemical resistant

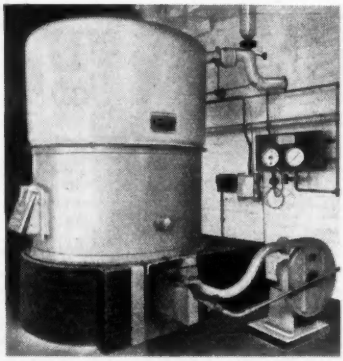
'ALKATHENE'

'Alkathene' brand of polythene is today finding a wide range of applications in the chemical industry for small vessels of various kinds, tubing, ducting, tank linings and pieces of special equipment. The outstanding properties of these fabrications include high chemical resistance, lightness in weight and toughness even at low temperatures.

IMPERIAL CHEMICAL INDUSTRIES LIMITED
LONDON, S.W.1.

ICI

P.376



The above photograph shows a Transportable Type furnace for a Perolene Plant.

FLUID HEAT
TRANSMISSION SYSTEMS

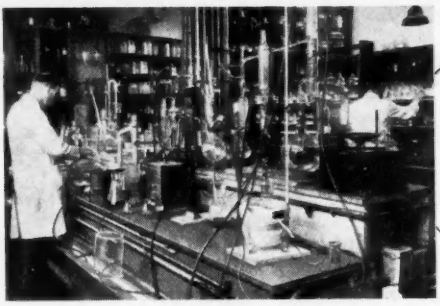
MERILENE & PEROLENE BUILT BY KESTNER

for Melting • Conveying • Processing and Heat Treatment of

RESINS • VARNISH • TAR • CHEMICALS
VEGETABLE AND FISH OIL • BITUMEN
PITCH • LEAD • ETC.

Main Advantages—
High Thermal Efficiency — Even Temperature Distribution
Automatic and Thermostatic Control
Elimination of Fire Risk — No High Pressures

Kestner's *Chemical Engineers*
5 · GROSVENOR GARDENS · LONDON · S.W.1



A Laboratory of Genatosan Limited.

E·MIL

In daily use all over the world

★ where both QUALITY and ACCURACY are ESSENTIAL

E·MIL REGD. TRADE MARK

GOLD LINE AND GREEN LINE
Volumetric Glassware and Chemical Thermometers

The finest and most accurate in the world yet costs no more than ordinary apparatus.

Send Now

Our latest Catalogue and New Price List will gladly be sent on request. It is important to you!

Tel. TAFFS WELL 278 (3 lines) **H. J. ELLIOTT LTD.** *Cables:* GLASS · PONTYPRIDD
E-MIL WORKS, TREFOREST TRADING ESTATE, Nr. PONTYPRIDD, GLAM.

The
Chemical Age

The Weekly Journal of Chemical Engineering and Industrial Chemistry

BOUVERIE HOUSE 154 FLEET STREET LONDON E.C.4
Telegrams: ALLANGAS FLEET LONDON · *Telephone:* CENTRAL 3212 (20 lines)

Volume LXII | 28 January 1950 | Number 1594

A Word for Technologists

IN the recently issued "Note on Technology in Universities" (THE CHEMICAL AGE, *62*, 115) it was not unwelcome to see that the University Grants Committee, in most paragraphs, chose the word *technology*, rather than the older term, *applied science*. That might seem of small importance, were it not for the ingrained custom on the part of a good many authorities of withholding from "technology" the recognition due to a recognisable science. In recent years, more than ever, it has become clear that the practical development of scientific ideas and results is not a lowly and subsidiary pursuit, but an integral field of knowledge with its own broad technique and principles. Any one who imagines that a new product or process is within sight of becoming of practical use when the final creative stage has been reached in research laboratories is a long way from reality.

The word technology is not a pretty word and to many people applied science may still seem preferable. Unhappily the latter term has been debased through the years, a debasement that has been made worse by the recent habit of qualifying "science" by "pure" or "fundamental" to indicate that applied science is not meant. The old tradition that science pursued for its own sake is superior to science put into practice has done quite enough harm without adding the inverse suggestion that applied science is unfundamental. The newer word, which breaks away from all this, is much better.

The University Grants Committee's note merits careful study from the same standpoint. The necessity to provide specialised education in technology in universities as well as in technical colleges will not be questioned. It is already accepted by most universities and expanding facilities have been given. The committee's main recommendation, that we should "build on to what there is" rather than aim at further expansion by creating separate technological institutions within the universities, seems wise—for two reasons. Much of the value of a university education is derived from the intermingling of students following diverse objectives; it is enough that specialisation should balance its own virtues and dangers in lecture rooms and laboratories. The second reason is, at the present time, even more important. The presence and expansion of technological education *in the universities* may bring what is urgently

On Other Pages

Leader:
A Word for Technologists . . 147
Notes and Comments:
Industries and the Election . . 149
Argentina and Germany . . 149
A Year's Chemical Trading . . 149
Study of Servo-Mechanisms . . 150
Better Omens for the BAC . . 150
Planning the Festival of Britain . . 151
Chemicals and Plastics at the BIF 152
Conservatives Pledges to Industry 152
Interchange of Students . . 153
Exports and Imports in 1949 . . 154
Ending Fertiliser Subsidies . . 155
Nuclear Fission of LiH . . 156
New Engineering Groups . . 156
"Berkelium" . . 156
Pestox 3 . . 156
The Programme for Chemical Engineering Research . . 157
The Elements of Cooling Water Control . . 159
Increasing Use of Sodium . . 164
New Patents Judge . . 165
British Petroleum Plant . . 169
Chemicals from U.S.A. . . 169
Petroleum Congress 169
Prices of British Chemical Products 172
Chemical Supplies and Services . . 176

The annual subscription to THE CHEMICAL AGE is 30s.; single copies, 9d.; post paid, 1s. SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3970). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham Midland 0784-5). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited

needed, a greater respect for "applied science" from those who teach and learn "pure science." Ivory towers and red brick (or concrete) should keep within sight of each other.

Like many documents of this kind, the committee's note leaves almost as much to be read between the lines as in them. In more than one passage the prickly subject of status makes a fugitive appearance. The committee has unfortunately left much unsaid. Class distinctions, in whatever form they express themselves, are insidious but very real obstacles to progress. Academic snobbery is a class distinction against which few reformers will venture. The committee has suggested that university courses in technology should be more closely linked with fundamental science; and that the courses in technical colleges should be rather more closely linked with industry's use of science. "Here, again, no difference in status is intended or implied; each type has its appropriate place and special field of usefulness." The committee's high-minded impartiality is not universal. Students, parents and even a good many employers will bear witness to that. Students are to be selected according to their potentialities for technological scholarships to the colleges or the universities. A transfer from a technical college to a university should not be regarded as "in any sense a form of promotion," adds the note.

The committee later deals all too softly with another aspect of status—the relationship between technological study and post-graduate pure research within a university. "We hope that the attraction of a Ph.D. degree awarded for research will not have the effect of drawing suitable candidates away from these courses." To express a hope is hardly an adequate approach. The realistic solution to this dilemma for the youthful is to recognise the equal right of a post-graduate student of technology to acquire a Ph.D. (or even a Ph.T.) degree. The professors and teachers of pure science have exercised too long and too arbitrarily a monopoly in the award of the higher degrees and academic titles. Men who usually can have had very little opportunity to appreciate the amount and quality of scientific thought needed to turn a scientific idea into an industrial fact may continue to withhold merited degrees from men who have devoted years to applied and creative science. To say that it is the man and not his qualifications that matter is airy idealism, even though in the final estimate it is often true. But not every estimate of capability is as well based as that. The committee's hope that "status" will be disregarded leaves the problem where it was before.

Notes and Comments

Industries and the Election

PRE-ELECTION statements of party policies, of which the Conservative contribution was crystallised in Wednesday's publication (*page 153 this issue*), leave little doubt that the issue which will determine the way in which many votes are cast will be the present and future relations between Government and industries. Here is the most direct conflict in which the Conservatives have given unequivocal assurances of their intention to give back to industries the freedom which they used so effectively in the past to sustain living conditions and services, and to relieve some, now State controlled, from the enervating disabilities which impersonal central direction appears to impose. Iron and steel and chemicals are among those which the Conservatives undertake to defend from a like state. The certainty that a Socialist Government would carry to extreme lengths its doctrine of Government direction in industry has now been underlined both by Sir Stafford Cripps's promise (at High Wycombe) of more development councils and the Labour Party manifesto's intimation that in another Socialist economy "The less efficient firms will be helped to raise themselves to the standard of the rest." That is capable of more than one interpretation. It certainly does not exclude the prospect that those undertakings which now operate efficiently and well at a profit, and already carry the largest burden represented by an inflated bureaucracy, may be required to carry also the lazy or inefficient rivals in their own sphere of activity.

Argentina and Germany

RECENT developments in the Argentine point to the re-establishment there of former I. G. Farben interests and the prospect of renewed German influence from a new quarter in the world chemicals and dyestuffs market. The Allied Control authorities have, of course, no jurisdiction over enterprises such as these, which may enjoy in South America fuller facilities than could be found just now anywhere in Europe. Information from Buenos Aires points to the fact that the Government-owned Central Bank of Argentina is giving preferential treatment as regards the allocation of foreign exchange (especially of scarce dollars) to formerly German-owned enterprises, the administration of which had been taken over, a few years ago, by the Dirección Nacional de Industrias del Estado. It is being recalled that last autumn the bank allocated U.S. $2.5 million for imoprts from the Federal German Republic. While relatively little has been allocated to private enterprises, the S.A. Anilinas Alemanas, a former I. G. Farben connection in the Argentine, has just been granted $750,000, one-third to be used for the import of dyestuffs and the remainder for the purchase of chemicals in general from Western Germany. It is expected now that negotiations are to begin to set up a new trade agreement between the Argentine and Western Germany to employ $115 million per annum, instead of the present total of about $55 million.

A Year's Chemical Trading

IN the final accounting of United Kingdom trading with the rest of the world in 1949 chemicals and non-ferrous metals are shown to have maintained a level which, could it be attained in all spheres, would go far to dispose of the balance of payments problem. That conclusion does not depend alone upon the steady rise in value of chemical exports to over £86 million, contrasted with £83.58 million in 1948 and £67.4 million a year earlier. Direct exports of chemicals are, in any case, a very incomplete reflection of the performance of chemi-

cal industries, whose contribution has certainly been a substantial factor in the enhancing of value of all U.K. exports in 1949 by £181.9 million to £1558.6 million. While that achievement in the general trading account was overshadowed by the rise of £194.4 million in payments for imports, principally in respect of raw materials (+£89.9 million) and food, drink and tobacco, the improvement in chemical trading is not diminished by a corresponding indebtedness to overseas sources. Chemical purchases in 1949, in fact, were reduced by some £5.4 million, to £25.3 million, and those derived from the U.S.A. last year were down from the £9 million level in 1949 to £6.4 million. Since the effect of devaluation operated only for about a quarter of 1949, it would not be wise to forecast future trading results with the U.S.A. and dollar countries in general by the standard set by these satisfactory results. Manufacturers of America's export chemicals appear confident that there will be no large-scale cuts in U.K. purchases, basing that view on the influence of ECA funds and the growing raw material needs of expanding British chemical industries.

Study of Servo-Mechanisms

THE perplexing liability of sciences and a good deal of technology to lead the practitioner into much wider fields than were foreseen at the start is one of the characteristic problems of current work on automatic control mechanisms. New advances have been made quicker than has been found the means of applying them with full effect to industries, many of which have more or less the same requirements but no means of pooling their information on servo-mechanisms. A good prospect that a group will now be formed to embrace all these interests is seen in the preparedness of the Society of Instrument Technology to form an "undenominational" group of all who are concerned with the theory or practice of closed loop control systems—servo-mechanisms, regulators and process controllers—of which the inaugural meeting is to be held in London on March 28. The Inter-Departmental Technical Committee on Servo-Mechanisms, a wartime creation, still operates, but its objectives are limited. The new group is intended to make good some of the deficiencies, providing a forum for the free discussion of scientific, technical and educational aspects of automatic control methods, not omitting the important factor of the human operator, serving as the controller or supervising the automatic operation.

Better Omens for the BAC

THE lukewarm interest with which a good many chemists appear to regard their only trade union organisation may undergo a change of temperature as a result of some changes announced in the first report in 1950 of the British Association of Chemists. One of the long-standing problems of the BAC has been the tendency of members in outlying groups to overlook the need to preserve and increase coherence among chemists of like interests. There have been reports of chemists—presumably not members of the BAC—joining trades unions having nothing to do with chemistry; and the failure of 300 to pay their subscriptions at the appointed time in 1949 does not bespeak a very lively sense of responsibility among members. A portent of better things in 1950 is the BAC council's decision to release for active service on a wider front the man who knows more about the merits and objectives of the BAC than almost anyone else. Mr. C. B. Woodley, who in March next will have completed 25 years as the association's general secretary, is to be freed from much of the headquarters responsibilities to undertake missionary and other duties in other parts of the country. The BAC also has, in the person of its 1950 president, Dr. Herbert Levinstein, a missionary whose energy and enthusiasm for infusing life into anything of value to industrial chemists and chemistry have been conspicuous in several other spheres.

PLANNING THE FESTIVAL OF BRITAIN

The Rôle of Chemistry and Chemical Industries

THE magnitude of the undertaking contemplated in presenting at next year's Festival of Britain a connected and fairly comprehensive impression of British chemical industries and the things on which they are founded is reflected in some preliminary information relating to the South Bank Exhibition. Much of this is tentative, but it clearly shows that the intention to provide a panorama of genuine educational value, rather than a trade fair, has not weakened. The character of the exhibition will be determined largely by the Festival of Britain staff and the Council of Industrial design, under the overriding control of a presentation panel. The scientific, chemical and industrial exhibits will, however, be shaped by the expert advisory committees, to include such authorities as Sir Robert Robinson, P.R.S., and the industrial organisations, among which the British Plastics Federation will be required to play a very active role. British plastics, materials and fabricated articles and plastics machinery will be represented in more than one aspect of the exhibition.

Chemicals and Sources

The interests of chemistry will be concentrated principally in the Dome of Discovery, where a series of exhibits will represent the development of chemical industries, and the National Resources Pavilion, where will be shown the uses made of Britain's national resources.

The theme of the exhibits in the Dome of Discovery will be the part played by chemistry in the production of familiar articles. It seeks to tell the story from the beginning and to pay full credit to the practical achievements of the alchemists. It will be called to mind, for example, that the distillation technique of the alchemists represents much the same principles as those underlying modern practice. Examples of old apparatus and its modern equivalents will be shown. This demonstration is likely to include representations of some of the relatively primitive processes, such as sublimation, followed by examples of contemporary large-scale crystallisation and filtration.

The beginnings of scientific chemistry will probably be recalled by practical illustrations of basic principles governing such things as the formation of compounds, with practical explanations of how elements enter into the composition of various articles in household use.

It is intended there shall be a large array of exhibits relating to accurate measurement, particularly of weights, which will include analytical equipment and provide for many people their first acquaintance with microchemistry.

A section devoted to atomic theory will serve to reveal some modern applications of the findings of Dalton and Faraday, the latter represented by electrolysis techniques. There will be simple explanations of the structure of molecules and of the determination of the properties of compounds by the arrangement of their elements.

This section will also provide scope for representation of the services of X-ray techniques and crystallography and some indication of the far-reaching importance of such things as the carbon compounds.

Synthesis

It is proposed that a section shall be devoted to synthesis and to the practical uses of the principle of manufacturing organic substances from inorganic materials. This will provide a natural introduction to the subject of plastics. The synthesis of urea is one of the likely subjects here, amplified by modern applications of this material in the plastics industry. This display will necessarily include the organic primaries obtained from coal tar and petroleum. Examples will be given showing progress in British synthetic chemistry. Most suitable subjects are dyestuffs and textiles, with references to colloidal chemistry, surface active agents and detergents.

Drugs, insecticides and vitamins will represent an individual section, and synthetic fibres and monofilaments are also capable of forming the subject of a separate display.

A section concerned with photography is expected to comprise examples of the early work of Fox Talbot, demonstrations of emulsions and other modern equipment and it is hoped to include illustrations of Scotland Yard's photographic techniques in criminology.

The Science Staff of the Festival of Britain and the Council of Industrial Design are still collecting stories of achievement from industries in which chemistry and physics play their part,

such as glass, optical glass, rubber, paint, metal founding, etc. It is hoped that all these industries will be fully represented.

In the mineral resources section of the Dome of Achievements the intention is to show various minerals from British territories which contribute to world supplies, and some of the end products. Coal will certainly be very adequately represented, especially in its aspect as a chemical raw material.

In the same section there will probably be displays of precious and semi-precious metals—gold, diamonds and platinum—and such base minerals as copper, lead, zinc, chrome, mica, bauxite, etc.

The foregoing sections will all be located in the Dome of Discovery. Another large pavilion will carry on the story from raw materials to finished products. In the Pavilion of Industry will be featured industries which are entirely British and whose products have a high value as being typically well designed British products.

It is proposed that in this pavilion the plastics industries should be given an opportunity of showing typical British machinery used in the manufacture of their products. It is intended that visitors to the exhibition will be able to see articles actually being produced.

That will require the inclusion of some of the newer extrusion or moulding equipment, much of which has not been shown in public. The British Plastics Federation will be the authority principally concerned with this.

Apart from the exhibits in the Dome of Discovery and Pavilion of Industry, a number of plastic products will be shown elsewhere, appearing in their proper setting in the domestic and industrial spheres, the homes and gardens section, and in the transport pavilion. In fact, there are hardly any sections of the exhibition where they will not be represented.

All plastic products displayed at the exhibition will be finally approved by an industrial panel to be nominated by the British Plastics Federation, to ensure that every article exhibited is technically sound.

Chemicals and Plastics for the BIF

ALTHOUGH the number of exhibitors in the chemicals section at this year's British Industries Fair will again show some reduction, such preliminary information as is available shows that the exhibits will adequately represent nearly all the products associated with the recent important advances in industrial chemistry.

The layout, introduced last year, when the various stands were grouped round a central display by three large companies, has again been adopted, states a correspondent of *The Times Survey of the British Industries Fair*. The section will remain at the left of the main entrance at Olympia.

Many new solvents and plasticisers based on petroleum are now in bulk production, and the range has been extended by the addition of a series of chemicals derived from ethylene oxide.

Among products for use in plastics, the introduction of itaconic acid shows considerable promise, and the same source will offer glucono delta lactone, an easily transportable form of gluconic acid, finding a wide range of applications.

Developments in the rubber industry include latex anti-corrosion compounds for the protection of metal surfaces, and a new preparation for the manufacture of latex foam which obviates the need for prolonged washing of the finished foamed rubber.

Pharmaceuticals will include new penicillin compounds, designed to maintain an effective concentration of penicillin in the blood stream without requiring frequent injections. The new antimalarials will also be in evidence.

The veterinary products will include Antrycide and a recently introduced penicillin bougie for the control of bovine mastitis.

Also of interest will be a series of brown pigments for paints, leather finishes, etc., based on lead chromo-molybdate, an orange pigment claimed to be much superior to the ordinary orange chrome.

A range of very pure metals will be shown, such as germanium and gallium, and their oxides, now being produced in Britain on an industrial scale for the first time.

At Earls Court there will be a combined British Plastics Federation stand, in which 16 firms are participating. The products displayed will include plastics materials and the latest applications, and technical mouldings and components.

There will be some new insulating materials which are non-cracking and non-hygroscopic.

CONSERVATIVES' PLEDGES TO INDUSTRY

"We Shall Bring Nationalisation to a Full Stop"

THE firm intention of the Conservative Party, if returned to power, to arrest the drive to place more industries under State control and to mitigate some of the worst results of the nationalisation already accomplished was confirmed in the party's policy statement, revealed on Wednesday.

The manifesto, "This is the Road," underlines the party's conviction that industry cannot flourish under the conditions of increasing centralisation of control. It says:—

We shall bring nationalisation to a full stop here and now. Thereby we shall save all those industries, such as cement, sugar, meat distribution, chemicals, water and insurance which are now under threat by the Socialists.

Steel Will be Reprieved

We shall repeal the Iron and Steel Act before it can come into force. Steel will remain under free enterprise, but its policy on prices and development will be supervised as in recent years by a board representative of Government, management, labour and consumers.

The nationalisation of omnibuses and tramways will be halted. Wherever possible those already nationalised will be offered to their former owners, whether private or municipal. We shall also be prepared to sell back to free enterprise those sections of the road haulage industry which have been nationalised, and to restore the former system of A and B licences. The limitation of distance on private road hauliers will be progressively eliminated. The present freedom of C licences will remain untouched.

As wide a measure of free enterprise as possible should be restored to Civil Aviation. We shall review the structure and character of the Airways Corporations with that in mind.

We shall drastically reorganise the coal industry as a public undertaking by restricting the duties of the National Board and by giving autonomy to the Area Boards. By decentralising the work of the National Board we shall give greater responsibility to the men on the spot and revive local loyalties and enthusiasm. "British Railways" should be re-organised into a number of regional railway systems each with its own pride of identity and each administered by its own board of direction whose members must have varied practical experience of serving public needs. We shall hold ourselves free to decide the future of the Gas and Electricity Boards when we have had more experience of their working.

The consumer must be given greater protection in the industries remaining nationalised. This can be done by a wider use of independent price tribunals, by stricter Parliamentary control of accounts, by finding time for a periodic review of each industry by Parliament and by subjecting them to examination by the Monopolies Commission or some similar body. Ministers' powers to make appointments will be defined and their powers to give directions will be clarified. Every nationalised undertaking will observe the Workers' Charter.

For coal, electricity and railways there should be separate Scottish boards which will act in concert with the English boards but in no way subordinate to them. We also propose a Scottish Gas Commission, responsible to the Secretary of State, to return wherever practicable and desired, the undertakings to local authorities, either singly or jointly.

The general direction of virtually all the proposals is summed up in these terms: "The policy of the Conservative Party is to restore to our country her economic independence and to our citizens their full personal freedom and power of initiative."

Interchange of Students

MR. J. NEWBY, representing Great Britain, was elected chairman at the third annual conference of the International Association for the Exchange of Students for Technical Experience, which was held recently at the Finland Institute of Technology, in Helsinki. The conference was attended by representatives of Austria, Belgium, Denmark, Finland, France, Great Britain, Holland, Italy, Norway, Sweden. The U.S.A. and Germany were admitted to membership and will interchange students during 1950.

Arrangements were made for the interchange of 1700 students during the summer of 1950; the interchange in 1949 was 1236. The next conference will be held in France in January, 1951, at the invitation of the Direction de l'Enseignement Technique.

EXPORTS AND IMPORTS IN 1949

Chemical Industry's Part in the National Totals

CHEMICAL exports in 1949 once again played an important part in the overseas markets of the United Kingdom. Although the return in December for "chemical manufactures," £3,888,325, was slightly lower than the same month of 1948, the total value of chemicals, drugs, dyes and colours for 1949 was £86,093,728, an increase of £2,512,581 compared with 1948, and £18,692,197 more than 1947.

The relatively small increase in exports this year does not fully acknowledge the credit due to the industry, for the value of imports, totalling £25,331,077, was £5,404,407 less than the figure for 1948.

Details of the export and import figures for December and for the year ended December 31, 1949, compared with the same periods of 1948, abstracted from the *Trade and Navigation Accounts of the United Kingdom*, December, 1949 (HMSO, 6s. 6d.), are set out below.

EXPORTS	Month ended 31 Dec. 1949	Month ended 31 Dec. 1948	Year ended 31 Dec. 1949	Year ended 31 Dec. 1948
Formic acid	Cwt. 3,189	Cwt. 1,995	Cwt. 35,588	Cwt. 30,130
Salicylic acid and salicylates	Lb. 116,192	Lb. 272,706	Lb. 2,144,325	Lb. 2,369,930
Value of all other sorts of acid	£91,577	£85,969	£1,099,135	£913,641
Aluminium oxide	Tons 321	Tons 110	Tons 4,086	Tons 3,841
Sulphate of alumina	2,605	3,087	33,185	34,697
All other sorts of aluminium compounds	665	313	11,674	4,712
Ammonium sulphate	15,668	15,577	262,144	221,044
Ammonium nitrate	4,658	9,045	67,612	97,075
All other sorts of ammonium compounds	1,214	1,186	17,554	17,402
Bleaching powder	Cwt. 13,652	Cwt. 43,604	Cwt. 319,297	Cwt. 423,519
All other bleaching materials	11,180	9,501	114,438	114,148
Cresylic acid	Gal. 177,202	Gal. 253,317	Gal. 1,445,464	Gal. 2,565,470
Tar oil, creosote oil, anthracene oil, etc.	3,859,388	3,542,895	35,377,171	37,359,438
Value of all other sorts of tar oil	£71,318	£67,724	£526,042	£575,955
Collodion cotton	Cwt. 923	Cwt. 2,298	Cwt. 26,035	Cwt. 23,304
Copper sulphate	Tons 1,612	Tons 1,079	Tons 38,267	Tons 24,524
Disinfectants, insecticides, etc.	Cwt. 36,810	Cwt. 38,057	Cwt. 524,398	Cwt. 679,952
Fertilisers	Tons 3,845	Tons 3,647	Tons 24,730	Tons 39,136
Nickel salts	Cwt. 3,920	Cwt. 6,834	Cwt. 56,406	Cwt. 60,084
Lead acetate, litharge, red lead, etc.	5,618	5,829	70,606	119,546
Tetra ethyl lead	Gal. 112,862	Gal. 140,482	Gal. 1,360,814	Gal. 1,346,738
Magnesium compounds	Tons 562	Tons 947	Tons 8,577	Tons 9,047
Methyl alcohol	Gal. 6,472	Gal. 9,849	Gal. 96,474	Gal. 93,239
Potassium compounds	Cwt. 5,699	Cwt. 5,829	Cwt. 69,540	Cwt. 100,867
Salt	Tons 18,278	Tons 21,826	Tons 215,826	Tons 202,509
Sodium carbonate	Cwt. 257,357	Cwt. 420,472	Cwt. 3,430,569	Cwt. 4,479,833
Caustic soda	252,540	56,826	2,287,417	2,225,404
Sodium silicate	21,131	34,866	302,571	208,496
Sodium sulphate	92,854	14,721	607,756	398,677
All other sodium compounds	89,695	79,326	921,428	955,969
Cream of tartar	288	206	5,081	3,798
Tin oxide	348	641	5,351	7,652
Zinc oxide	Tons 828	Tons 1,771	Tons 12,681	Tons 14,174
Total value of chemical manufactures, excluding drugs and dyestuffs	£3,888,325	£3,932,961	£45,974,506	£46,498,837
Quinine	Oz. 142,473	Oz. 157,094	Oz. 2,125,784	Oz. 1,811,991
Acetyl-salicylic acid	Lb. 134,468	Lb. 160,482	Lb. 1,663,030	Lb. 1,220,237

Insulin	100 International Units 800,913	100 International Units 1,659,816	100 International Units 12,066,398	100 International Units 10,792,366
Penicillin	Mega Units 899,261	Mega Units 442,986	Mega Units 7,576,394	Mega Units 4,315,563
Total value of drugs, medicines and preparations	£1,587,859	£1,427,066	£18,371,709	£15,746,351
Total value of dyes and dyestuffs	£644,471	£843,893	£9,956,221	£8,517,937
Total value of paints, pigments, colours, etc.	£921,194	£1,134,849	£11,791,292	£12,818,022
Total value of chemicals, drugs, dyes and colours	£7,041,849	£7,338,769	£86,093,728	£83,581,147
Plastic materials	Cwt. 41,014	Cwt. 30,016	Cwt. 414,472	Cwt. 385,317
Value	£512,000	£383,080	£5,162,539	£4,702,690
Chemical glassware	Cwt. 1,404	Cwt. 1,299	Cwt. 14,549	Cwt. 16,926
Value	£54,505	£47,347	£568,623	£578,630
Fans	Cwt. 7,126	Cwt. 235	Cwt. 56,348	Cwt. 2,123
Value	£160,909	£144,871	£1,537,968	£1,266,888
Furnace plant	Cwt. 9,611	Tons 512	Cwt. 84,708	Tons 5,435
Value	£127,719	£80,870	£1,088,143	£979,370
Gas and chemical machinery	Cwt. 19,960	Tons 1,282	Cwt. 309,072	Tons 10,370
Value	£237,850	£319,412	£3,667,812	£2,208,918

Imports	Month ended 31 Dec. 1949	Month ended 31 Dec. 1948	Year ended 31 Dec. 1949	Year ended 31 Dec. 1948
Acetic acid	Cwt. —	Cwt. 4,353	Cwt. 22,020	Cwt. 225,032
Boric acid	3,250	400	62,859	62,662
All other sorts of acid	889	4,290	41,093	45,601
Borax	12,200	2,400	217,902	249,267
Calcium carbide	—	31,259	47,578	225,907
Coal tar products (excluding benzol and cresylic acid)	20	6	18,427	114,136
Cobalt oxides	268	304	5,721	7,215
Arsenic	Tons 250	Tons 1,200	Tons 2,969	Tons 7,533
Fertilisers	4,929	4,367	88,272	94,554
Glycol ethers and glycol ether-esters	Lb. 433,822	Lb. 10,905	Lb. 5,365,437	Lb. 3,769,003
Iodine	75,050	—	753,151	791,784
Potassium chloride	Cwt. 795,569	Cwt. 556,966	Cwt. 7,914,344	Cwt. 8,760,726
Potassium sulphate	21,140	24,476	418,352	364,184
All other potassium compounds	5,747	1,562	69,659	50,019
Sodium nitrate	120,691	168,225	895,107	907,078
All other sodium compounds	4,940	5,519	60,959	49,084
Carbon blacks (from natural gas)	64,286	28,736	562,447	874,815
Total value of chemicals, drugs, dyes and colours	£2,454,097	£1,945,550	£25,331,077	£30,735,484

Ending Fertiliser Subsidies—Possible Cuts in Consumption

THE Government's decision to remove by July, 1951, all subsidies on fertiliser prices, was described as "a matter for regret" by Dr. Alexander Fleck, chairman of Scottish Agricultural Industries, Ltd., at the company's annual general meeting in Edinburgh last week.

Dr. Fleck observed that the removal of the subsidies would increase the cost of fertilisers to farmers by something like 50 per cent. Although this increase would be balanced, in whole or in part, by a compensating adjustment in farmers' crop realisations, "such a sudden and large rise" might well have the effect of discouraging farmers from maintaining or increasing the present level of fertiliser consumption. The greatest possible utilisation of fertilisers was essential, the chairman said, to the fulfilment of the plans for expanding the nation's agriculture.

There was a special need for the company to conserve resources to finance stocks and debtors at much higher values; the company's responsibility would be to do everything possible to promote the efficient use of the optimum amount of fertilisers, despite the discouragement of a much higher price scale.

"The need is clear," said Dr. Fleck, "and we will use all reasonable means at our disposal to help farmers to meet the difficult circumstances."

NUCLEAR FISSION OF LiH

Not a Source of Industrial Energy

THAT the potentialities of the nuclear fission of hydrogen-lithium, should they be developed, are purely military is the view of Dr. Hans Thirring, the Austrian physicist, who has stated that he does not believe that the energy released can be harnessed for industrial purposes.

Dr. Thirring told *The Times'* correspondent in Vienna that the power of the plutonium bomb could be greatly increased if plutonium were used to set off a chain reaction in some other more easily accessible and cheaper elements. Closer study showed that if a combination of hydrogen and lithium were detonated it would theoretically release some 29 million kWh of energy per lb. of material, as compared with 11.3 million for the same quantity of uranium-235 and 2.2 million for a " heavy hydrogen bomb."

Although the specific amount of energy released in the hydrogen-lithium bomb is only twice that of U-235, a super bomb with a thousand-fold destructive power might be made from hydrogen and lithium for the simple reason that it is available in enormously greater quantities than either plutonium or U-235.

The nuclear reaction which released the energy of the LiH bomb—that was the formation of two alpha particles from a lithium nucleus and a proton—did not occur as a self-sustained chain reaction like the fission process in uranium, but was a process which could be started only at a very high temperature of several hundred million degrees.

Hence it seemed to be very likely that any LiH super-bomb would have to be fitted with a core consisting of an ordinary atom bomb to serve as a kind of detonator. That was why the number of super-bombs would probably in practice, be restricted by the amount of available fissionable material—namely, plutonium and U-235.

" Berkelium "

THE University of California has announced that its cyclotron has produced a new element, which is said to be the heaviest known—it is No. 97 in the atomic scale. Its discoverers are Dr. Stanley G. Thompson and Mr. Albert Thorso, research associates of Dr. Glenn T. Seaborg, professor of chemistry at the university and co-discoverer of the four other new elements. The newest element has been tentatively named Berkelium.

NEW ENGINEERING GROUPS

Servo and Engineering Equipment

AN attempt is being made, under the auspices of the Ministry of Supply and the Society of Instrument Technology, to bring together those who are interested in the scientific, technical and educational progress of automatic control mechanisms.

An inaugural meeting of a section formed by the Inter-departmental Technical Committee on Servo-mechanisms and the Society of Instrument Technology will be held in London on Tuesday, March 28 at 6.30 p.m. at the Royal Society of Tropical Medicine and Hygiene, Manson House, Portland Place, W.1.

The following papers will be read: Prof. K. A. Hayes, " Servo-mechanisms—Recent History and Basic Theory "; Dr. A. Utley, " The Problem of Stabilisation "; Prof. A. Tustin, " Problems in Control Systems which await Solutions."

It is hoped that the support by persons interested in control mechanisms and allied subjects will be sufficient to warrant the formation of a control section within the framework of the Society of Instrument Technology.

Standardisation of Equipment

A new association, the Engineering Equipment Users' Association, to provide a means for exchanging information on the standardisation of engineering equipment which they use in common, has been formed by five leading British companies in the process industries field. The founders are: Anglo-Iranian Oil Co., Ltd., Courtaulds, Ltd., Imperial Chemical Industries, Ltd., Lever Brothers and Unilever, Ltd., and Shell Petroleum Co., Ltd.

Brig. L. F. S. Dawes has been appointed secretary of the association, which will work in collaboration with the British Standards Institution. The offices are at 20 Grosvenor Gardens, S.W.1.

New Insecticide : Pestox 3

Attention is called to the inadvertent use of the term " Bisol 3 " in one passage in a recent commentary on the successful results of full scale tests of Pestox 3, the new systemic and selective insecticide based on an organic phosphorus compound. Pestox 3 (bis (bis dimethylamino phosphonous) anhydride) is produced by Pest Control, Ltd., Cambridge.

[Bisol has been used as the registered trade mark of British Industrial Solvents, Ltd., since 1930.]

THE PROGRAMME OF CHEMICAL ENGINEERING RESEARCH

British Scientists' Lead in Fundamental Work

By A SPECIAL CORRESPONDENT

BRITAIN, in comparison with other leading industrial countries, has been slow in developing the applications of chemical research, regardless of the fact that in fundamental research the record of British scientists is second to none. The adoption by investigators in Germany or the United States of discoveries originating in the U.K. and their development to the production stage has been a fairly common phenomenon.

The relative lack of progress in these more practical activities has been attributed in part to the limited extent of Britain's chemical engineering industries, deeply involved as they are in supplying adequately the day-to-day needs of industries. In the U.S.A. the development of these industries and their plant research programmes has been stimulated by the requirements of a huge oil industry. Germany, too, has been critically dependent on research chemists to solve supply problems resulting from the inadequacy of essential raw materials.

Practical Applications

Britain has in recent years awakened to the realisation that only by the application of research to practical problems can industrial leadership be maintained. The existence of the Department of Scientific and Industrial Research and the recent acceleration and widening of its activities are sufficient evidence of the changing outlook upon this subject. In these national research programmes chemical engineering science in its many branches will be accorded a prominent place, not only because of the close links between chemistry and engineering, but also because of the rapid expansion of Britain's chemical industries.

The development of chief potential importance was the establishment early this year of the committee set up by the Advisory Council to investigate the entire field of chemical engineering research in Britain. It is the task of this committee to find out what Britain needs most in the field of chemical engineering research and how far these needs are met by existing facilities, and to suggest the establishment of further facilities.

The committee itself is satisfactorily representative of organisations throughout Britain which are concerned with applied chemical research. The DSIR, with its 40 associations and 14 stations, receives all the evidence it needs of the developments bearing on chemical engineering research. Mr. H. W. Cremer, chairman of the committee, was lately president of the Institute of Chemical Engineers. Industry is represented by several members, including Mr. J. Davidson Pratt, a director of the Association of British Chemical Manufacturers, also by a representative of the British Chemical Plant Manufacturers' Association.

Liaison With Universities

The universities are associated with the committee through Prof. D. M. Newitt, of the Imperial College, Prof. F. H. Garner, of Birmingham, and Prof. T. C. R. Fox, head of the chemical engineering faculty at Cambridge, which was started last year—the first faculty of its kind to be established at the older universities.

The field for the committee's investigations is extremely wide. Chemical engineering research is so closely linked with chemical research, physics, metallurgy and other associated sciences that no clearly defined lines of demarcation can easily be laid down.

One of the prime objects of the survey is to ascertain what methods are being employed to make practical use of available knowledge, and what chemical engineering research is necessary to follow up an idea to the production stage.

The Production Stage

Research is at present being carried on at the universities, at the stations of the DSIR, in the research associations, and in numerous industrial establishments. In fact, much more is being done in this direction than is generally realised, although at this stage no complete picture can be given of the results that may be expected.

These fields of research have received an enormous impetus from industry derived from the new petroleum-chemical plants of

the Manchester Oil Refineries Group, Shell Chemicals, I.C.I., Ltd., and British Petroleum Chemicals in Scotland. The associated or independent oil refineries being erected, such as the Anglo-American project at Fawley, Southampton, and the extension of the Anglo-Iranian group's operations at Llandarcy are providing parallel fields providing new scope for chemical engineers.

All these undertakings constitute a new and very large section of the chemical industry which was predominantly American in the past, mainly because Britain had no domestic oil industry, so that technological "know-how," apart from the Anglo-Iranian refinery at Abadan, was largely in the hands of Americans.

Britain's Refineries

While British scientists and engineers have developed a large number of heavy chemicals and fine chemicals plants, and manufacturers have been selling oil equipment, the men on the spot with first-hand experience of the actual applications of the latter plant were frequently operating outside this country. Now that Britain has a rapidly growing refinery industry of her own, British scientists and engineers will have opportunities on a scale never offered before to keep in the forefront of oil technology and of the associated chemical engineering practice.

In the fields of oil and synthetic oil, the DSIR's interest is centred mainly in the Fuel Research Station at Blackwall Lane, Greenwich.

A good example of the dependence of chemical engineering for its basic data on physical and chemical research is afforded by investigations into hydrocarbons which are being carried out by Birmingham University, in co-operaton with some of the major oil companies.

Common Fundamental Patterns

Co-ordination of research is also being accorded increased attention. During the past year the DSIR has been conducting a survey on drying processes and is getting together a bibliography on drying. They are being aided in this task by the Ministry of Fuel, whose Regional Fuel Engineers are attempting to ascertain the fuel efficiency of the various drying equipment used in industries.

While the Ministry of Fuel is approaching the problem from the standpoint of plant and fuel efficiency, the DSIR is trying to discover whether there is a common fundamental pattern in drying which can be applied to all industries. In other words, they aim to find out whether knowledge of drying a particular material obtained by one industry could be used for assisting the development of plant for another industry. In the past there has been little attempt to co-ordinate this knowledge, each industry regarding its own problems as unique. Henceforth, there will be a pool of acquired knowledge and experience from which any industry can draw. A very large number of references have already been acquired.

On the metallurgical side, various organisations, such as the British Iron and Steel Research Association, the British Cast Iron Research Association and the Non-Ferrous Metals Research Association, in conjunction with the National Physical Laboratory, are making contributions to physical knowledge which are of great interest to chemical engineers. Useful contributions are now also to be expected from the work of the Ceramics Research Association at Stoke-on-Trent, certain aspects of which have a close bearing on chemical engineering.

Even more practical work in applied research is, of course, being done by independent organisations, such as the Amalgamated Research and Development Corporation, Messrs. E. Mactaggart and the Fulmer Research Institute.

Link With Mechanical Engineers

Britain's new mechanical engineering laboratories to be established at East Kilbride will be closely associated with chemical engineering research. A separate building is to be erected for research in the field of heat transfer. It is believed that this will be the first laboratory in the world to concentrate exclusively on this subject. The study of hydraulic machinery and of such subjects as mechanics of solids and properties of materials generally will provide a mass of fundamental data for the use of the chemical engineer.

Incomplete though it remains at present, the picture is indeed encouraging, for it is evident that a very large and comprehensive programme of chemical engineering research is gradually taking shape.

A fundamental defect of research work in the past has been the lack of organised general publicity in Britain, which is doubtless one of the main reasons for the tendency to underestimate the existing facilities for research of all kinds This contrasts with the United States, where a great deal more publicity is given to the achievements of chemical research.

THE ELEMENTS OF COOLING WATER CONTROL

Automatic Regulation of Thermal and Flow Values

by LEO WALTER, A.M.I.Mech.E., etc.

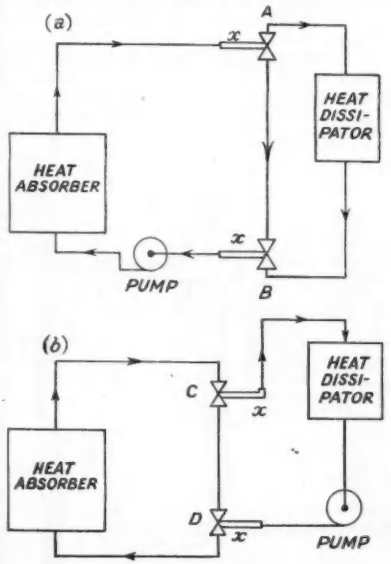
MORE water is used in industry for cooling than for any other purpose, and by automatically controlling its consumption a great amount of water can be saved. That, of course, is not the only saving that automatic control of flow by instruments can confer. Other advantages likely to result include improvement of quality of production, increased output, saving of fuel and power by reducing the load of cooling pumps.

By recirculating water and automatic admixture of fresh water in the right quantity, water cooling can be performed where raw water is scarce, or where water treatment must be reduced. The demands on spray ponds or cooling towers may be relieved by automatic control and the use of controlled recirculation, and the cost of cleaning mains and plant may also be considerably reduced.

The first step towards taking advantage of automatic control is obviously to find out how much water is used by each individual plant. Measurements or calculations in one form or another, are inevitable. The essential measuring instruments are reliable rate of flow meters, pressure gauges, and thermometers.

Cooling water can sometimes be saved by reducing the head at which water is pumped throughout a works. This will in itself reduce excessive consumption at certain plant equipment, but will still leave much scope for automatic temperature regulators for reducing the quantity of cooling water used.

It is usually possible to estimate the rate of flow of cooling water in pipes by calculations, employing the methods and formulæ to be found in the text books. It can therefore be assumed that the minimum, average and maximum rates of flow to each individual plant equipment is known.



Figs. 1a and 1b

Automatic Temperature Control

Cooling water, wherever it is used, must be delivered to plant equipment at a definite temperature and in a definite volume (rate of flow), in order to meet the varying requirements of the plant at any moment. "Cooling balance" can obviously be achieved only where dissipation of heat is performed so that the flowing water carries off just sufficient BThU to keep the process temperature steady.

This applies generally to all industrial cooling problems, whether using an open or a closed circuit, and "gradual" or "metering" control is the type sought. Thus preferable for cooling water control are "throttling" controller types, in which the control valve moves gradually to increase or reduce the rate of flow, according to the demand. There are some instances where on/off method of control is applicable, having the control valve in the cooling water supply, opening or closing fully, according to water temperature at the point of use. The effect, more drastic and abrupt, serves well enough in processes in which small plus or minus temperature effects of short duration can be tolerated.

Another important method of automatic control has already been mentioned in connection with use of recirculation, namely, water blending. Mixing valves or thermostatic blenders can be used with advantage, or thermostatic 3-way diversion valves for admixture of fresh raw water to warmer return water, or for diversion of part of the return water from the cooler.

The layout of a typical self-actuated automatic mixing valve or blender installation is shown diagrammatically in Fig. 1a, and of the thermostatic diversion valve in Fig. 1b (p. 159). In each case two heat exchangers are used with a by-pass between them, a method of cooling water control which has the decided advantage, over the throttling method of control, that the actual flow volume is always the same. Temperature control is performed not by changing the rate of flow, but by varying the temperature of a constant rate of flow.

Fundamental to any such heat exchangers are the heat absorber and the heat dissipator. The heat absorber may be an engine jacket, a cooled furnace door, or chemical condenser; the heat dissipator can be a cooling tower, a water cooler, or a refrigeration plant. A suitable circulation pump is required in both layouts for movement of the cooling water, and in both illustrations the single connection of the 3-way valve must come on the delivery side of the pump.

In positions B and C, control is performed by means of water mixing (blenders), whereas in positions A and D the 3-way valve is acting as a by-pass, or diversion valve, proportioning the flow through and around one of the heat exchangers. The only difference in the two diagrams is that the direction of flow in the by-pass has been reversed.

It should be noted that in some layouts the second heat exchanger does not exist and the outlet on one side of the blender or diversion valve discharges to "waste." That, however, is not always the drain; it is likely to be part of another plant equipment, such as a hot water tank, where the heat is useful.

Automatic control and dissipation of heat is not always easy, ranging from very simple throttling control to elaborate programme control. The type of regulator and the mode of control chosen, depend on the purpose, working conditions and plant design. The deciding factor is the amount and the rate at which the process temperature changes with change of rate of cooling. In other words, the rate of cooling load required, and the change of this rate for keeping process temperature steady are factors which influence choice of controller type.

Where the cooling rate of a process is steady, or varies only slowly and in small amounts, the control problem is obviously simple. Frequent and heavy changes of cooling load complicate the control problem, and require more responsive and more adaptable types of cooling controllers.

Inertia of cooling water flow retards the effect of throttling, blending or by-passing. Such delays are the "process time lags." They are characteristic of the cooling process, and often influence accuracy or close-

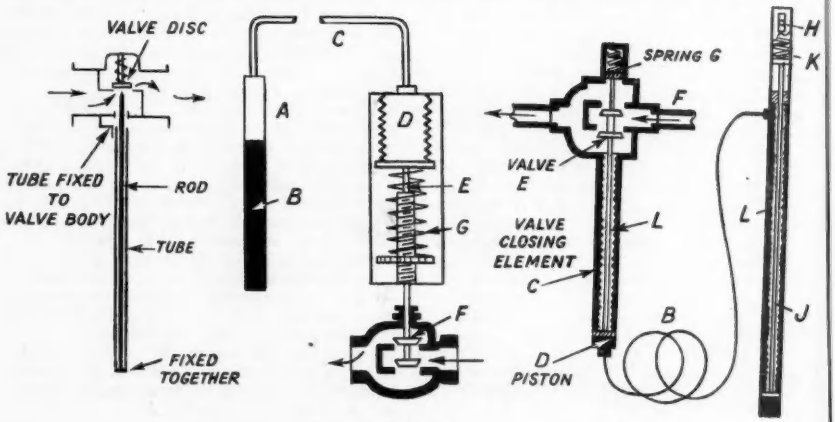


Fig. 2

ness of control much more than controller characteristics (instrument qualities).

Flow velocity of cooling water through a heat exchanger is necessarily one of the largest influences determining the amount of heat that can be carried away. In other words, the heat transfer factor of a heat exchange surface depends not only on design of the jacket or coils but also on supply pressure and the diameter of the cooling water pipe.

Design of Regulators

The great majority of cooling water controllers are of very simple design, and belong to the self-operating type. There are, however, cooling problems, mainly connected with chemical reactions, which require more elaborate, power-operated temperature regulators, employing for their operation compressed air or water under pressure. Where on/off mode of control is applicable, electric thermostat-or pressurestat-switches are used, acting on solenoid valves, motorised valves, or *via* a relay on motor starters for pumps.

Operating Principles

The main characteristics of the operating principles of various systems of thermostatic temperature control are worth studying. They include these:—

Metal (or Metallic) Expansion.—Automatic movement is provided by the heat expansion of metals. The movement is small but powerful. Response to temperature change is comparatively slow; suitable for medium temperatures.

Bi-metal.—Automatic movement is provided by the effect of heat on two strips of dissimilar metals, in close contact and having different rates of expansion. When heated they expand with a bending movement, one metal expanding more rapidly than its partner. There is average movement and medium power. It responds quickly to temperature change, but is suitable only for low temperatures.

Vapour Pressure.—Automatic movement is provided by the expansion of the vapour given off by a liquid when brought to boiling point. There is average movement and medium power. It responds quickly to temperature change and is suitable for medium temperatures.

Liquid Expansion.—Automatic movement is provided by the heat expansion of a liquid. There is ample movement and considerable power. This is suitable for medium temperatures.

Resistance-Thermometer and Thermocouple

The electrical resistance of a wire varies with changes of temperature. Change of resistance can be translated into movement for control purposes. Thermocouple movement is produced by the effect of heat on two parallel wires of dissimilar metals, fused together at one end. When the fused tips are heated a minute electric current is generated which brings into play a second circuit having sufficient

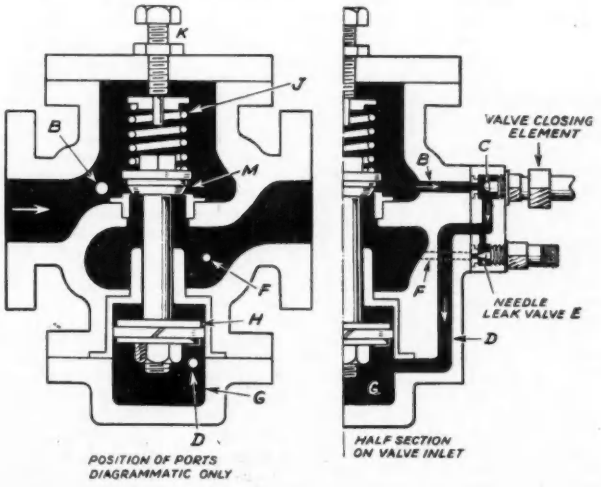


Fig. 3

A common pilot controlled, piston operated control valve, shown here in diagrams, incorporates these essentials: B, D, F ports cast in the body; C pilot valve; E leak valve; G piston chamber: H piston; J and K spring and tension regulator

power to operate the regulator. This affords very quick response to temperature change and is suitable for high temperatures.

Practically all the makes and types of temperature control apparatus on the market utilise one or other of these basic principles of thermostatic control.

Types of Controllers

A temperature controller is "self-actuated" when the movement generated in its thermostat is sufficiently forceful to be transmitted directly to the valve, tap or switch in the supply line.

A temperature controller is "power-operated" when the movement generated in its thermostat is not sufficient to perform the same operation. In such cases the thermostat movement operates a pilot valve or relay switch, which brings into operation auxiliary power (compressed air, electricity, oil or water under pressure). Much larger valves or switches may thus be operated than would be possible by direct movement from a thermostat and more powerful and responsive thermostats are practicable.

It is not intended to describe in detail the numerous designs or the more common thermostats, because they can be found in makers' literature and in other literature, cited later in the bibliography.

Fig. 2 shows diagrammatically various self-actuated temperature regulators, consisting of the rod and tube type, the vapour-actuated regulator and the liquid filled regulator. A very common type of control thermostat is the self-actuated pilot-operated type (Fig. 3). Power is derived from water pressure, varied by means of a pilot valve operated from the temperature detecting element, according to demand for cooling. This type is very familiar to plant engineers. Electric thermostat switches do not call for detailed description. Either a bi-metal strip or a coil bends or unbends with change of cooling water temperature, thus making or breaking an electric circuit, or filled capsules or bellows expand or contract. It is characteristic of all temperature controllers for cooling purposes, that the control valve opens with rising process temperature, and vice versa. This valve type is usually called "reverse-acting."

Electric resistance thermometer-controllers and thermocouples can be used for gradual electrical control methods. Fig. 4 shows a thermocouple control system using the following principle:

(A) is the temperature sensitive element (thermocouple). The fused tips of the thermocouple are in the cooling space, exposed to change of cooling water temperature. The voltage of the consequent electric current produced is in proportion to the heat being dissipated. The free ends of the thermocouple are connected to a sensitive millivolt meter (B), thus making a circuit. The system then is completed with the relay (C) and the electrically operated valve (D) in the cooling water supply.

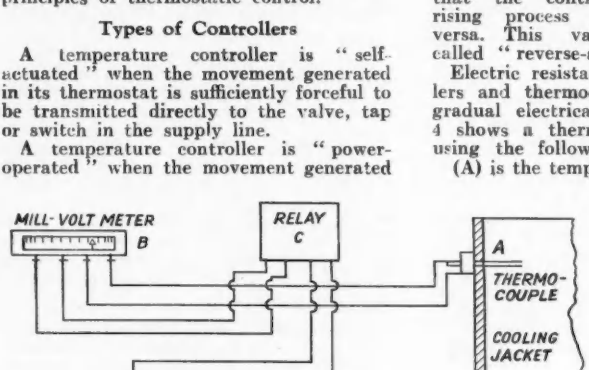


Fig. 4

When the thermocouple is acting as a thermostat controlling the operation of a valve, the minute electric current, generated by the couple when cooled to a certain temperature, brings into play a second circuit which supplies the voltage required to operate the regulating valve by means of an electric relay. The thermocouple is very sensitive and shows a quick response to temperature change, but the power it can generate is measured in thousandths of a volt.

(To be continued)

Lower Aluminium Prices

The installation of improved rolling mill equipment is cited by the British Aluminium Co., Ltd., as the factor which has enabled it to reduce prices for the thinner gauged materials. For sheet, coiled strip and circles, reductions for basic quantities are from ½d. to 7½d. per lb., according to thickness. Prices for Rigidal corrugated aluminium sheets are also reduced.

The Chemist's Bookshelf

HIGH POLYMERIC CHEMISTRY. W. S. Penn, 1949. London: Chapman and Hall, Ltd. Pp. 487. 36s. net.

The author of this book expresses the hope that it will become a standard textbook and work of reference, both for students and those engaged in research. It is therefore disappointing that, although the author deals enthusiastically with a vast number of topics, he does not often give the impression of having direct practical contact with the chemistry concerned, and his work as a whole lacks the authority, depth, and sense of balance needed in a textbook.

To some extent the title is misleading, for several chapters are partly concerned with technology, particularly of plastics and rubbers, and the author evidently assumes his readers to know something of these subjects. Technical terms occur frequently; tables of properties from the technical literature are reproduced; compounding recipes are included; and most of the photographs illustrate the manufacture and uses of plastics. A rather arbitrary selection of the patent literature is cited. Some patents are treated with more respect than they deserve, while others, which have been landmarks in the industrial development of polymers (*e.g.*, the I.G. diene emulsion interpolymerisation processes) receive no acknowledgment.

About one-quarter of the book is devoted to physico-chemical topics, such as polymerisation mechanisms, molecular-weight measurements, and relation of physical properties to structure. These sections are descriptive and free of mathematics. It is surprising to find almost no reference to that familiar feature of modern polymerisation theory, initiation by a free radical from the breakdown of a catalyst molecule. Most of the remainder of the book describes various high polymers, grouped according to chemical type. Their presentation is influenced by the author's views on commercial utility, and on the whole he has struck a fair balance between the various subdivisions.

Both chemical and technological specialists are likely to disagree with some of the data and opinions presented in these chapters. For example: in discussions of emulsion polymerisations the BIOS reports and the results of recent American research are practically disregarded, yet the rather misleading treatment of the subject in Mark and Raff's textbook is once more quoted; redox polymerisation is presented mainly in terms of German and American rubber technology, without discussion of the theory of the subject contributed by British chemists; the so-called "allyl" plastics are discussed apparently without recognition that they are thermo-hardening because their monomer molecules contain two double bonds. The recent redox data share an appendix with older data on Friedel-Crafts catalysis, which should have been in the main text.

The many subjects discussed are kept in order by a numbered decimal system of paragraphs, but this does not prevent considerable repetition. The text is marred by many printer's errors and mistakes in chemical names and formulæ. In naming chemical compounds, the author uses dots, hyphens, numerals, capitals, etc., quite haphazardly; many readers may also dislike the colloquial style in which some passages are written. Abundant data and references are the best features of the book.—R.G.R.B.

Petroleum Products

THE increasing importance attached to petroleum derivatives and their industrial application is reflected in a series of six lectures on "Special Products from Petroleum" to be given at the Sir John Cass College, London, beginning on Thursday, March 2. The chair for the whole course will be taken by W. S. Ault, who will also deliver the first introductory lecture.

Remaining lectures, which will be given on Thursday evenings at 6.30 p.m., will deal with: "Corrosion Preventive Compounds," W. Pehl (March 9); "Metal Working Lubricants," W. H. Adams (March 16); "Electrical Oils," V. Biske (March 23); "Technical White and Medicinal Oils," G. H. Harries (March 30); and "Petroleum Waxes and Petrolatums. Aromatic Extracts," S. T. Minchin (April 6). There will be questions and discussion.

Increasing Use of Sodium

Adaptability as a Reducing Agent in Organic Synthesis

From A SPECIAL CORRESPONDENT

SODIUM is fast becoming one of the most important reducing agents available to the organic chemist. Substantial and increasing quantities of the metal are to-day being used for the reduction of fatty acids to alcohols in the preparation of synthetic detergents; reduction of ketones and ester-ketone mixtures to glycols; reduction of carboxylic acids into aldehydes and reduction of nitriles to form high molecular weight primary and secondary amines.

Producing Organic Chemicals

Although now the largest single use of sodium is in the manufacture of tetraethyl lead it may well be that within a few years a greater tonnage of the metal will be employed as a reducing agent in the manufacture of a wide range of organic chemicals.

In the production of fatty alcohols secondary alcohols are usually preferred to either primary or tertiary alcohols; the former react too easily with sodium and tertiary are too sluggish in their reaction. The secondary alcohols, on the other hand, are more easily controllable. Choice of alcohol is, of course, determined by several factors, notably cost, availability, ease of recovery and solubility of the intermediate products.

In the reduction of the triglyceride esters present in coconut oil methyl amyl alcohol is often used. The process involves treating the oil, which largely consists of the glycerides of lauric and myristic acids with smaller quantities of oleic, stearic, palmitic, capric, caprylic and caproic, with metallic sodium and adding the reducing alcohol as fast as it is consumed by the reaction. In these conditions quantitative yields of fatty alcohols in the form of their sodium salts, are obtained, together with the trisodium salt of glycerine and the sodium salt of methyl amyl alcohol.

The present industrial method is, of course, a logical development of the familiar ester reduction process discovered by L. Bouveault and G. Blanc (Ger. Pat. 164,294 (1903)). The original method had the disadvantage of requiring a large excess of sodium, the bulk of which was lost by reaction with water and therefore ineffective in so far as the reaction was concerned.

In the production of glycols use has been made of a process described by Chablay (*Comp. rend.*, 156, 1021 (1913): *Ann. Chem.* (9) 8216 (1917)), which entails the reduction of an ester with sodium and liquid ammonia in absolute alcohol, *e.g.*, dimethyl sebacate will give decamethylene glycol. Another method of preparing glycols by the use of sodium entails the reduction of mixtures of ketones (Wieman, *Comp. rend.*, 212, 764-5 (1941): *Chem. Zentr.*, 1942, I, 2123).

Good yields of aldehydes can be produced from carboxylic acids, *e.g.*, from salicylic acid it is possible to obtain 64 per cent of salicylaldehyde which is an important raw material in perfume manufacture. This reduction makes use of the sodium amalgam method of Weil and Marcel (*Ber.*, 55, 2664 (1922)) and subsequent development by Davies and Hodgson (*J. Soc. Chem. Ind.*, 62, 126 (1943)).

Formation of Amines

The reduction of nitriles to form high molecular weight primary and secondary amines makes use of metallic sodium, *e.g.*, dodecylamine and tetradecylamine can be produced from the respective nitriles as described by Kraft (*Ber.*, 23, 2360 (1390)). The amines, which are generally isolated as their salts, must be treated with alkali hydroxide to obtain the free amine. By reducing fatty nitriles with sodium and alcohol excellent yields of primary amine without secondary amine formation can be secured; with other standard methods involving hydrogenation some secondary amine is invariaby formed.

The interesting dibasic acid, pimelic acid, can be made by the action of sodium and isoamyl alcohol on salicylic acid, guaiacol carboxylic acid, or anthranilic acid. The reaction is comparatively simple and good yields are obtained. It represents an improvement over more conventional methods, *e.g.*, from pentamethylene dibromide through the cyanide process.

Heat Resistant Ceramic

A new ceramic material, "Stupalith," combining lithium, aluminium and silica, capable of withstanding a heat shock of at least 2000°F., has been developed for the United States Air Force for jet engines and other applications.

· PERSONAL ·

MR. J. F. R. JACKSON has been appointed director of research of the recently formed research and development division of the British Steel Founders' Association, Sheffield. He was formerly chief metallurgist and technical controller in the foundries of David Brown & Sons (Huddersfield), Ltd., gear wheel and steel castings makers. Mr. Jackson will be mainly concerned with relating scientific knowledge and steel foundry practice for the improvement of production and technique.

SIR HENRY DALE has been elected president of the British Council in succession to Lord Riverdale, who has resigned for private reasons. Sir Henry was a member of the council's executive committee from 1942-1949, and chairman of its science advisory committee from 1942-1949.

DR. G. I. HIGSON, technical director, Billingham Division, Imperial Chemical Industries, Ltd., will represent the chemical industry on the Industrial Mission to Pakistan which is due to arrive in Karachi on February 26. The doctor served on the International Commission on synthetic nitrogen held in Egypt in 1948.

SIR BEN LOCKSPEISER, secretary of the Department of Scientific and Industrial Research, is to perform the official opening of the Research and Production Exhibition of the British Welding Research Association, on February 6, at its London headquarters, 29 Park Crescent, W.1 (THE CHEMICAL AGE, 62, 22).

MR. G. A. S. NAIRN, chairman of Lever Brothers, Port Sunlight, Ltd., on January 21 was installed president of the Birkenhead and Wirral branch of the United Kingdom Commercial Travellers' Association, of which the first Lord Leverhulme was the first president.

MR. T. C. FAWCETT, re-elected as chairman of the Chemical and Allied Trades Section of the Manchester Chamber of Commerce, is northern regional manager of I.C.I., Ltd. Our reference to the Chemical and Allied Trades Section (62, 117) wrongly associated him with the General Chemicals Division of I.C.I.

MR. FRANCIS D. MORRELL and MR. ARTHUR HARTOG, directors of Lever Bros. and Unilever, Ltd., have arrived in New York to assume responsibility for the interests of the company there.

DR. F. J. PATON, director of research of the Dunlop plantations in Malaya, has left by air to take up his duties in the new rubber research centre which Dunlop is about to open in Negri Sembilan, and which will work in close co-operation with the Rubber Research Institute in Malaya. Dr. Paton, formerly associated with the School of Fermentation Chemistry at Birmingham University, went out to Malaya for Dunlop 16 years ago to investigate problems relating to the production of latex. His assistant director, MR. D. W. POUNDER, went out to Negri Sembilan in the Autumn, and there is to be a rotation of staff between Malaya and the research centre at Fort Dunlop.

MR. JAMES MACLEOD, retired Glasgow chemical engineer, left estate valued at £15,034.

The New Patents Judge

AT the beginning of the New Year Mr. Justice Lloyd Jacob started his work as the Patents Judge. He had been appointed in accordance with the Patents and Designs Act of 1949, which provided for the first time that a special puisne judge should be appointed to deal with patents designs matters. At the moment he does not appear to be very busy, as part of his time has been spent sitting as an additional judge of the King's Bench Division.

The new judge is 52. He was called to the Bar by the Middle Temple in 1923 and began a distinguished career in the next year by becoming King Edward VII Scholar of his Inn. His success at the patents bar was recognised by his appointment in 1937 as junior counsel to the Board of Trade in Patent matters. He held this appointment until he became a King's Counsel in 1945.

Mr. Justice Lloyd Jacob is not well known outside the profession because patent cases rarely attract notice from the daily papers. He lives in Dorking, and is a lay reader of the Diocese of Guildford.

Obituary

The death has occurred of MR. A. GLYNNE LOBLEY, managing director of Birlec, Ltd., makers of heat-treatment and melting furnaces, Tyburn Road, Erdington, Birmingham, 24.

Next Week's Events

MONDAY, JANUARY 30

The Chemical Society

Leeds: University, 6.30 p.m. Dr. F. L. Rose: "The Basis of Chemotherapeutic Research."

Incorporated Plant Engineers

Leeds: University, 7.30 p.m. (West and East Yorkshire Branch). W. F. Gerrard. "Steam Plant Scale."

TUESDAY, JANUARY 31

Hull Chemical and Engineering Society

Hull: Church Institute, Albion Street, 7.30 p.m. W. N. Espie: "The Manufacture and Testing of Portland Cement."

Society of Instrument Technology

London: Manson House, Portland Place, W.1, 6.30 p.m. J. C. Evans, M. Groneck and H. G. Loe: "Continuous Gauging of Materials in Thread or Wire."

Parliamentary and Scientific Committee

London: Savoy Hotel, Strand, W.C.2. Annual meeting, 11.30 a.m.; luncheon 1 p.m.

WEDNESDAY, FEBRUARY 1

Institute of Welding

Manchester: Reynolds Hall, College of Technology, 7 p.m. I. C. Fitch: "Arc Welding Electrodes, their Uses and Abuses."

Institution of Works Managers

London: Royal Society of Arts, John Street, Adelphi, W.C., 6.45 p.m. (With Institute of Industrial Supervisors). "The Relationship Between the Foreman and the Works Manager."

Society of Public Analysts and Other Analytical Chemists

London: Burlington House, Piccadilly, W.1, 7 p.m. (Physical Methods Group). "Modern Methods of Moisture Determination." Papers and discussion.

Manchester Metallurgical Society

Manchester: Engineers' Club, Albert Square, 6.30 p.m. (With Iron and Steel Institute). Mrs. C. F. Tipper: "Brittle Fracture in Mild Steel."

THURSDAY, FEBRUARY 2

The Chemical Society

London Burlington House, Piccadilly, W.1, 7.15 p.m. H. M. Powell: "The Structure of Molecular Compounds"; G. Stein and J. Weiss: "Chemical Actions of Ionising Radiations on Aqueous Solutions."

North Wales: Bangor, University College, 5.30 p.m. Prof. F. E. King: "Some Aspects of the Chemistry of Simple Peptides."

Sheffield: University, 5.30 p.m. Prof. H. W. Melville: "The Breakdown of High Polymer Substances."

Incorporated Plant Engineers

Peterborough: Eastern Gas Board, Church Street, 7.30 p.m. T. W. Palk: "Thermostatic Control."

Institute of Metals

Birmingham: James Watt Memorial Institute, Great Charles Street, 6.30 p.m. A. R. Powell: "Recent Progress in the Production of Some of the Rarer Metals."

Leeds Metallurgical Society

Leeds: University, 7 p.m. Prof. A. Preece: "Oxidation and Scaling of Steels."

Institute of Packaging

London: Waldorf Hotel, Aldwych, W.C.2, 6 p.m. "Packaging and the Exporter."

FRIDAY, FEBRUARY 3

Society of Chemical Industry

Brighton: Technical College, 7 p.m. (Joint meeting with RIC). Dr. J. L. Edgar: "Modern Methods of Organic Solvent Manufacture."

Glasgow: (Plastics and Polymers Group with Glasgow Section). Dr. W. C. Fergusson (I.C.I., Ltd., Plastics Division): "Polytetrafluorethylene."

Institution of Chemical Engineers

Manchester: College of Technology, 3 p.m. (North-West Branch). Annual general meeting. Sir Wallace Akers: "Atomic Energy."

Society of Chemical Industry

Manchester: Gas showrooms, Town Hall Extension, 6 p.m. Major F. A. Freeth: "The Art of Scientific Discovery."

SATURDAY, FEBRUARY 4

British Interplanetary Society

London: Caxton Hall, Westminster, S.W.1, 6 p.m. Discussion: "The Effects of Interplanetary Flight."

Textile Institute

Macclesfield: King's School, 10 a.m.-5 p.m. One-day conference and discussion: "The Preparation of Continuous Filament Yarns for Weaving and Knitting." Opening by the president of the institute, J. Foster Beaver.

HOME

Zinc Prices Cut

A reduction of zinc metal prices by £2 per ton (to £85 10s.) was announced this week. The various grades of zinc oxides are also subject to a price reduction of £1 15s. per ton.

Long Service Record

Over 280 employees and pensioners with a combined service of more than 8000 years recently attended a dinner given in their honour by Evered & Co., Ltd., Smethwick. Badges and awards were presented by the chairman to all those who had completed 50, 25, and 15 years with the firm.

Coal Output Down

The recovery in production of deep-mined coal in Britain which followed the Christmas and New Year holidays was checked last week. Comparative figures are:—Last week: Total 4,421,900 tons (deep-mined 4,170,900 tons, opencast 251,000 tons); previous week: Total 4,474,100 tons (deep-mined 4,231,400 tons, opencast 242,700 tons).

Big Steelworks Fire

One of the biggest blazes in the district since the "blitz" days has occurred at the Lancashire Steel Corporation's works at Irlam, near Manchester. The fire involved a 300 ft. long conveyor, carrying coal to the head of a 150ft. tower, whence it is fed into the chemical extraction plant. Firemen set up a wall of water at the foot of the tower, but two hours elapsed before the blaze was under control.

Rapeseed and Rapeseed Oil

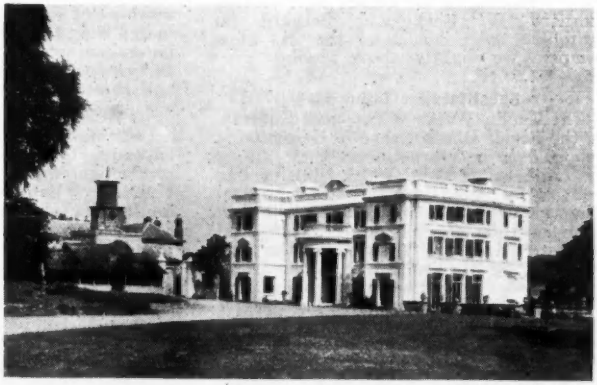
Limited imports of rapeseed and rapeseed oil from Argentina under individual licence were permitted as from Monday (January 23). Applications for import licences are being dealt with by the Oils and Fats Division, Ministry of Food, London Road, Stanmore, Middlesex.

Minister of Supply at Stockton Works

The Minister of Supply, Mr. G. R. Strauss, recently visited the Stockton works of the Power-Gas Corporation, Ltd., and Ashmore, Benson, Pease & Co., Ltd. During his tour the Minister saw a model of the proposed new works representing the companies' planned extensions on a 100-acre site.

Twenty-one Affected by Chlorine Gas

A motor tanker containing a bleach fluid on January 16 accidentally discharged its contents into a tank containing hydrochloric acid at the Roe Acre Dyeing and Felting Co.'s mill at Heywood (Lancashire). Twenty-one people who were detained in hospital suffering from effects of the chlorine gas evolved were next day stated to be "very comfortable." Workmen on night duty at the mill and people living in streets adjoining the mill were affected by the gas. Police and firemen wearing gas masks searched the mill to see that all the workers were out, and police cars used loudspeakers to warn residents of the danger, and to stress the need for a flow of air through their houses to dispel the gas.



[Photograph, Monsanto Chemicals, Ltd

Evidence of the widening research activity by Monsanto Chemicals, Ltd., is the company's acquisition of Fulmer Hall, Buckinghamshire, which, after conversion and the installation of equipment, will be used as an additional research centre. Only eight months have elapsed since the company's new central research unit was opened at Ruabon (THE CHEMICAL AGE, 60, 781-2)

D

OVERSEAS

Egyptian Phosphates for Japan

Egypt is to supply 50,000 tons of phosphates, valued at £E125,000, to Japan. A further 200,000 tons are to be shipped later.

German Industries Fair

Organised for the first time since the war by a committee composed entirely of Germans, the 1950 German Industries Fair will be held at Hanover in two parts, the first from March 29 to April 2 being devoted to light industries, and the second from May 3-14 to heavy industries.

Horlicks Plant for Australia

Horlicks, Ltd., the milk processers, are planning to establish at a cost of about £A250,000 a second plant in one of Australia's richest milk producing areas, at Nowra, N.S.W. The company already operates a plant in the southern part of the State.

Synthetic Fibres in Western Germany

Output of rayon and staple fibre in the Federal German Republic was doubled last year according to the report of the Association of Rayon and Staple Fibre Manufacturers. The first production of Perlon in Western Germany was begun towards the end of last year.

Pure Liquid Helium

A single drop of pure condensed helium gas, reputedly the only one of its kind in the world, has been isolated by scientists at the Argonne National Laboratory, Chicago, Illinois. This light helium, or HE_2, was isolated by Darrel W. Osborne, Bernard Weinstock and Bernard M. Abraham, who condensed the gas at a temperature slightly above absolute zero to $-453.93°$ F.

Substitute for Lithopone?

The Kaolin Works Wiesa, near Kamenz, in the Soviet Russian zone of Germany, is reported to be marketing a new filling material, called Belit, which is claimed to be a perfect substitute for lithopone, etc. The new product is a colloidal kaolin won from local deposits according to a special process. It is to be used in the first instance by the rubber manufacturing, cosmetics and pharmaceutical industries. Filling materials have so far been scarce in Eastern Germany and have had to be imported. However, it is hoped that the Wiesa Works will soon be in a position to cover the zone's whole needs in this respect.

Another German Blast Furnace

The Huckingen Metallurgical Works, Duisburg a/R., announces the starting this month of its third blast furnace. Monthly crude steel capacity of this works is about 65,000 metric tons.

Albania's First Match Factory

Albania's first match factory started operations in Tirana at the beginning of this year. Daily output is reported to total 20,000 boxes. The required chemical raw materials are being supplied by the Soviet Union.

Swiss-Brazilian Fertiliser Plant

Reports from Brazil state that a company is to be formed, with the participation of Swiss capital, for the production of nitrogenous fertilisers in the State of Bahia. According to present plans, an annual production of about 45,000 metric tons may result.

Italian Sulphur for Australia

An agreement for the shipment of 150,000 metric tons of Sicilian sulphur, valued at about 4 milliard lira, is reported to have been made by Italy with Australia and New Zealand. Italy agreed to accept payment in sterling, to be used for the purchase of raw materials from Commonwealth countries.

Swiss Chemical Exports

Swiss exports of chemical and pharmaceutical goods rose sharply in December, amounting to (million Swiss francs): 54.0, as compared with 40.3 in November. Particularly noteworthy is the marked increase in value of shipments of aniline dyes and indigo from 16.0 to 25.3. Exports of pharmaceutical products increased by 3.3 to 19.3, industrial chemicals from 6.3 to 6.8, and cosmetics from 2.0 to 2.6.

Russian Chemicals in 1950

Impetus given by German chemists is expected to produce greatly increased production in chemical industries in the U.S.S.R. Estimated production figures for 1950 include: caustic soda 390,000 tons; carbonate of soda 800,000 tons; mineral fertilisers 5.1 million tons; other synthetic fertilisers 43,000 tons. Raw materials allocated for the industry are scheduled to be increased to provide 250 million tons of coal, 35.4 million tons of crude oil and 1.9 milliard cubic metres of gas. Preparation of numerous chemical products for plastics, colours, varnish, medicinals, etc., is being intensified.

BRITISH PETROLEUM PLANT
Alleged Shortcomings of Suppliers

OUTSPOKEN criticism of shortcomings to which it was alleged some U.K. suppliers of oil refining and similar equipment are prone was made in Glasgow last week by Mr. C. H. Rebbeck, an official of the Anglo-Iranian Oil Co., Ltd. Mr. Rebbeck, speaking to the Scottish section of the Council of British Manufacturers of Petroleum Equipment, criticised in particular the high costs of such plant and alleged that extremely long delays in fulfilling orders were common.

Constructional costs all over the world were much too high, said Mr. Rebbeck, and when they went up a vicious spiral was started and fewer orders for plant and equipment were placed by manufacturers. The costs as they applied to oil sites were raised by a number of factors, the most important of which were the failure by manufacturers to adhere to promised delivery dates and frequently the unsatisfactory quality of the material supplied.

Slow Deliveries

Of orders placed by his company 96 per cent were not delivered by the specified date. That meant that the costs on the job were greatly increased. There were many difficulties preventing firms completing an order on time, but it was of vital importance that they should let the buyers know the situation, so that adjustments in the employment of labour could be effected.

It was no longer true that Britain produced the best quality materials. Even if materials were delivered on time, delays were often experienced and costs again raised when the constructional engineers had to effect adjustments and reject certain materials which were not up to standard. A great deal of the materials which came from the manufacturers was of no use for the job in hand.

"Give us good delivery of the proper quality of materials properly packed," Mr. Rebbeck said, "and you are going to bring down costs. If you do this, you are not only helping yourselves, but you are helping the rest of industry as well."

Mr. R. A. Browne, who gave the council a description of organisation within the Anglo-Iranian Oil Company, recommended that U.K. manufacturers should attach more importance to the production of spare parts for general machinery. Britain lagged very far behind America in that respect.

CHEMICALS FROM U.S.A.
No Drastic U.K. Cuts Foreseen

CERTAIN factors assume considerable importance in determining the possible course of (U.S.) chemical trade. Outstanding are the return of pre-war suppliers to full competition, the ever-growing use of bilateral agreements, and the complex currency situation. The latter is a dominant factor.

The greater shortage of dollars, the devaluation of the pound, which countries will have the currencies with which to pay for goods—all bear on the chemical trade.

The devaluation of the pound has not had any immmediate effect upon trade between the U.S. and the U.K., nor has it so far greatly affected the domestic market. A decrease in the high postwar exports of the U.K. is anticipated, but ECA assistance and the expansion of the British chemical industry also are factors along with devaluation.

Efforts to increase British exports to dollar countries will be intensified and all advantages resulting from the financial measure will be utilised. However, it must be remembered that to bridge the pre- and post-devaluation gap British exporters must earn at least as many dollars as the difference in the value of the currency.

In the case of third markets, the United Kingdom enjoys a distinct advantage. It can operate in a price zone between a $2.80 and a $4.03 pound; where feasible, it will maintain its former prices and enjoy a significantly greater return.

(*Mr. C. C. Concannon, chief of the Chemical Branch of the Office of International Trade, U.S. Department of Commerce in "Chemical and Engineering News."*)

Petroleum Congress

THE Institute of Petroleum has been invited to form a national committee to represent Great Britain at the third World Petroleum Congress to be held at The Hague, Holland, from May 28 to June 6 next year.

The British delegates will be: E. A. Evans, Lieut.-Colonel S. J. M. Auld, C. Chilvers, T. Dewhurst, Prof. F. H. Garner, H. S. Gibson, H. Hyams, G. Sell, C. A. P. Southwell and H. C. Tett.

Papers will be presented under the following headings: geology and geophysics; drilling and production; refining technology; petrochemicals; analysis and testing; utilisation of products; plant and equipment; transport, storage and distribution; economics and statistics.

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the list available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

TANKS & LININGS, LTD. (formerly TANK LININGS, LTD., & THOMPSON-JARAY, LTD.), Droitwich. (M., 28/1/50.) December 21, £10,000 (not ex.) mortgage to Lloyds Bank, Ltd.; charged on land, factory and buildings at Town Wharf, Droitwich. *Fluctuating around £10,000 (bankers). April 19, 1949.

WOODALL-DUCKHAM VERTICAL RETORT & OVEN CONSTRUCTION CO. (1920), LTD., London, S.W. (M., 28/1/50.) December 20, charge and deed of variation by way of substituted security for securing to Alliance Assurance Co., Ltd., £180,000 owing under a charge dated June 4, 1947, and a further advance of £120,000; charged on 63/77 Brompton Road, S.W.3. *£180,000. June 10, 1949.

Satisfactions

HAREFIELD LIME CO., LTD., Cowley (Middx.). (M.S., 28/1/50.) Satisfactions December 29, of mortgage registered October 9, 1936, of debenture registered February 15, 1940, and of charge registered June 6, 1941.

PETROCHEMICALS, LTD., London, W. (M.S., 28/1/50.) Satisfactions December 29, of two trust deeds registered August 20, 1947.

Increase of Capital

The following increases in registered capital have been announced: CHARLES KARENE & CO., LTD., from £5000 to £20,000. WITCO CHEMICAL CO., LTD., from £25,000 to £30,000.

New Registrations

Private company. (477,383.) Capital £1000. Manure and fertiliser manufacturers, grease refiners, manufacturers of soap and washing materials, etc. Directors: E. T. Banks, H. J. Holford, A. F. Dolman. Reg. office: 57 Bridge Street, Newport, Mon.

Company News

Benn Brothers, Ltd.

The directors of Benn Brothers, Ltd., publishers of THE CHEMICAL AGE, have declared the following dividends, less tax, payable on February 15: 3 per cent on the preference shares for the half-year ended December 31, 1949, and interim dividend of 5 per cent on the ordinary shares (same).

British Chemicals & Biologicals, Ltd.

Net profit for the year to June 30, 1949, was £16,069 (£3723). As last year, no dividend has been recommended on the ordinary stock.

Fisons, Ltd.

A final dividend of 9½ per cent making 12 per cent, less tax (same) for the year ended June 30 on the old ordinary stock and a dividend of 2½ per cent, less tax, on the £2,219,278 new ordinary stock, issued in October, are recommended. Net profit of the group was £222,639 (£223,167).

Power-Gas Corporation, Ltd.

Group profit on trading was £337,918 for 1949 (£267,221). Payment of a dividend of 12½ per cent, subject to income tax, was recommended.

The creation of a new works on a fresh site was the aim of a programme of long-term construction, and negotiations for a site near the present works were being completed.

Redfern's Rubber Works, Ltd.

Dividends of 3¾ per cent on the A and B preference shares, making 7½ per cent for the year, and of 5 per cent on the ordinary shares, making 10 per cent (plus a bonus of 5 per cent) were recommended, to be paid on March 15.

Stewarts & Lloyds, Ltd.

From the beginning of this year, all the mineral properties of Stewarts & Lloyds, Ltd., the Stanton Ironworks Co., Ltd., and other subsidiary companies, and land associated therewith, were transferred to Stewarts & Lloyds Minerals, Ltd., by which company they will in future be owned and operated. The directors are: Mr. J. R. Menzies-Wilson (chairman), Mr. R. B. Beilby and Mr. A. F. Holden, and the secretary Mr. J. McLaren. The administrative office of the company is at Brigstock, near Kettering, Northants.

Chemical and Allied Stocks and Shares

MARKETS have remained cautious and inactive under the influence of the imminent General Election, although the undertone has been described as firmer since Mr. Churchill's broadcast and the improvement in British Funds in evidence since the end of last week. British Funds recorded sharp gains ranging up to £1 in long dated stocks, moderate buying having a disproportionate influence because of the very small amount of selling.

Industrial assurance shares were marked back sharply on the mutualisation proposals, although selling was very moderate. In the nationalisation context, cement shares also fell back sharply, but chemicals, after earlier small declines, tended to recover.

Imperial Chemical, after falling to 40s. 6d. at one time last week, have since rallied to 41s.; Fisons at 26s. have strengthened on the financial results. Albright & Wilson were 29s., Amber Chemical 2s. shares 5s., Bowman Chemical 5s. 6d., and Brotherton 10s. shares 19s. 3d. Monsanto Chemical were 50s. 9d., F. W. Berk 2s. 6d. shares 14s. 3d., Pest Control 8s. 3d., and Boake Roberts 25s. 6d. W. J. Bush were 61s. 3d., Laporte Chemicals 5s. ordinary 9s. 4½d., and Lawes Chemical 9s. 6d.

Boots Drug fell back further to 47s. following reports of the big new issue, and Borax Consolidated weakened to 55s. 3d. British Glues 4s. shares have been firm at 19s. 6d., British Match steady at 34s., and Dunlop at 60s. 9d. regained part of an earlier decline. Levers, however, have eased to 41s. 6d., and Lever N.V. to 43s. 6d. At 39s. 3d. British Aluminium lost some ground, but General Refractories showed firmness at 23s. 1½d. Metal Box were 87s. 6d., United Glass Bottle were firm at 68s. 9d., and Turner & Newall were good at 76s. 6d. United Molasses eased further to 38s. 6d., and De La Rue to 22s. 9d. British Xylonite were 57s. 6d., and British Industrial Plastics 2s. shares 4s. 6d. International Combustion 5s. shares have been steady at 16s. 4½d., and Babcock & Wilcox 59s.

Movements in iron and steels were again small, investors failing to be attracted by the good yields because of the threat of nationalisation. With few exceptions current prices still remain well below the scheduled take-over levels fixed in the event of nationalisation. United Steel were 26s. 3d., Dorman Long 31s., Hadfields 26s. 9d., Colvilles 34s. 6d., and Richard Thomas & Baldwins 13s. 9d. Guest Keen were 40s. 3d., Staveley 78s. 3d., and T. W. Ward were firm at 56s. Amalgamated Metal firmed up to 17s. 9d., but Triplex Glass at 18s. failed to hold an earlier small rally.

Among cements, the nationalisation threat put Associated back to 72s. 6d., British Portland to 71s. 3d., Tunnel to 42s. 9d., and Rugby Cement to 15s. British Plaster Board have been steady at 12s. 9d., and Pinchin Johnson rallied to 36s. 6d. Oil shares, after earlier declines, turned firmer on hopes that an agreement may be made to modify Britain's decision to reduce oil imports from the dollar countries. If the latter is carried out it may lead to lower oil prices in the U.S.A. and this in turn would affect world oil prices and mean lower profits for the producers. Shell have rallied to 63s. 1½d., Anglo-Iranian to 6 7/16, and Trinidad Leaseholds to 22s.

More Import Relaxations

THE removal of import licensing restrictions from a further wide range of goods, in accordance with the Government's previous agreement with the OEEC (THE CHEMICAL AGE, *61*, 868) became effective on January 25.

Further chemical items, drugs, medicines, etc., now freed from import restrictions include:—

Acid sodium pyrophosphate; carmine; compounds (not including ores or minerals) of thorium, cerium and the other rare earth metals; compounds (not including ores or minerals) of molybdenum and vanadium; lanoline; magnesium glycero phosphate.

The new facilities apply to those countries (excluding the U.S.A., S. American countries, U.S.S.R., etc.) to which previous aid has been extended.

U.K. Light Metal Statistics

Ministry of Supply statistics relating to U.K. production, imports and consumption of light metals in November include the following (in long tons):—Virgin aluminium: production 2332, imports 9047. Secondary aluminium: production 6835. Aluminium scrap arisings: total 9823, consumption 9500. Aluminium fabrication: 17,922. Magnesium fabrication 295.

Prices of British Chemical Products

Sounder Basis of Trading in Most Centres

FEW changes have been noted in the industrial chemicals market during the past week and conditions are reported to be steady. There is an increase in consignment, both for foreign and home deliveries, and makers are quoting firm delivery dates. Coal tar products are, without exception, steady. Pitch is moving well, both on home and export account, and there is a strong demand for xylol.

MANCHESTER.—Firm price conditions have continued in virtually all sections of the Manchester chemical market. The textile and allied industries and other principal home trade consumers are taking good deliveries of caustic soda and other alkalis, and a wide range of other heavy chemicals is being absorbed in substantial quantities. New bookings on both home and export account have been on a fair scale during the past week. Among the fertiliser materials superphosphates and sulphate of ammonia are in gradually improving demand. Mixed trading conditions are reported in the tar products market, with the light distillates being called for in reasonably good quantities.

GLASGOW.—Business in general in the Scottish chemical market has improved slightly, principally as a result of the opening up of the textile trade after the New Year holidays. The export market continues to show an improvement.

Price Changes

Rises: Barium carbonate, barium sulphate, liquid chlorine, copper carbonate, copper chloride, copper nitrate, paraffin wax, sodium percarbonate, sodium sulphide, zinc oxide.

Reductions: Borax, boric acid.

General Chemicals

Acetic Acid.—Per ton: 80% technical, 1 ton, £61; 80% pure, 1 ton, £66; commercial glacial 1 ton £71; delivered buyers' premises in returnable barrels; in glass carboys, £7; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £110 per ton.

Acetone.—Small lots: 5 gal. drums, £90 per ton; 10 gal. drums, £85 per ton. In 40/45 gal. drums less than 1 ton, £70 per ton; 1 to 9 tons, £69 per ton; 10 to 50 tons, £68 per ton; 50 tons and over, £67 per ton.

Alcohol, Industrial Absolute.—50,000 gal. lots, d/d, 2s. 1d. per proof gallon; 5000 gal. lots, d/d, 2s. 2½d. per proof gal.

Alcohol, diacetone.—Small lots: 5 gal. drums, £133 per ton; 10 gal. drums, £128 per ton. In 40/45 gal. drums: less than 1 ton, £113 per ton; 1 to 9 tons, £112 per ton; 10 to 50 tons, £111 per ton; 50 to 100 tons, £110 per ton; 100 tons and over, £109 per ton.

Alum.—Loose lump, £17 per ton, f.o.r. MANCHESTER: Ground, £17 10s.

Aluminium Sulphate.—Ex works, £11 10s. per ton d/d. MANCHESTER: £11 10s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—2 cwt. non returnable drums; 1 ton lots £40 per ton.

Ammonium Carbonate.—1 ton lots: MANCHESTER: Powder, £52 d/d.

Ammonium Chloride. — Grey galvanising, £27 10s. per ton, in casks, ex wharf. Fine white 98%, £21 10s. to £22 10s. per ton. See also Salammoniac.

Ammonium Nitrate.—D/d, £18 to £20 per ton.

Ammonium Persulphate.—MANCHESTER: £5 per cwt. d/d.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d. £78 and £76 10s. per ton.

Amyl Acetate.—In 10-ton lots, £171 10s. per ton.

Antimony Oxide.—£140 per ton.

Antimony Sulphide.—Golden, d/d in 5 cwt. lots, as to grade, etc., 1s. 9½d. to 2s. 4½d. per lb. Crimson, 2s. 6½d. to 3s. 3½d. per lb.

Arsenic.—Per ton, £38 5s. to £41 5s., ex store.

Barium Carbonate.—Precip., d/d; 2-ton lots, £27 5s. per ton, bag packing, ex works.

Barium Chloride.—£35 to £35 10s. per ton.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £29 10s. per ton d/d; 2-ton lots, £29 15s. per ton.

Bleaching Powder.—£25 15s. per ton in casks (1 ton lots).

Borax.—Per ton for ton lots, in free 140 lb. bags, carriage paid: Anhydrous, £54; in 1-cwt. bags, commercial, granular, £34 10s.; crystal, £37; powder, £38, extra fine powder, £39; B.P., granular, £44; crystal, £46; powder, £48-£48 10s.; extra fine powder £48.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granular, £62; crystal, £69; powder, £66 10s.; extra fine powder, £68 10s.; B.P., granular, £75 10s.; crystal, £81; powder, £78 10s.; extra fine powder, £80 10s.

Butyl Acetate BSS.—£149 10s. per ton, in 10-ton lots.

Butyl Alcohol BSS.—£145 10s per ton, in 10-ton lots.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid £8 per ton, in 4 ton lots.

Charcoal, Lump.—£25 per ton, ex wharf. Granulated, £30 per ton.

Chlorine, Liquid.—£28 10s. per ton d/d in 16/17-cwt. drums (3-drum lots).

Chrometan.—Crystals, 6d. per lb.

Chromic Acid.—1s. 10d. to 1s. 11d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Cobalt Oxide.—Black, delivered, 8s. 5d. per lb.

Copper Carbonate.—MANCHESTER: 1s. 7d. per lb.

Copper Chloride.—(53 per cent), d/d, 1s. 11½d. per lb.

Copper Oxide. — Black, powdered, about 1s. 4½d. per lb.

Copper Nitrate.—(53 per cent), d/d, 1s. 10d. per lb.

Copper Sulphate.—£47 5s. per ton f.o.b., less 2%, in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £7 8s. per 1-2 cwt. lot, d/d.

Ethyl Acetate.—10 tons and upwards, d/d, £103 10s. per ton.

Formaldehyde.—£31 per ton in casks, according to quantity, d/d. MANCHESTER: £32.

Formic Acid.—85%, £64 per ton for ton lots, carriage paid. 90%, £67 5s. per ton.

Glycerine.—Chemically pure, double distilled 1260 s.g. £123 per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d to 8s 9d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—1s. 0½d. per lb. d/d, carboys extra and returnable.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Iron Sulphate.—F.o.r. works, £3 15s. to £4 per ton.

Lactic Acid.—Pale, tech., £80 per ton; dark tech., £70 per ton ex works; barrels returnable.

Lead Acetate.—White, £107 per ton. (Nominal.)

Lead Carbonate.—British dry, ton lots, d/d, £115 10s. (Nominal.)

Lead Nitrate.—About £116 per ton d/d in casks. MANCHESTER: £110.

Lead, Red.—Basis prices per ton: Genuine dry red lead, £119 10s., orange lead, £131 10s. Ground in oil: red, £140 10s., orange, £152 10s.

Lead, White.—Basis prices: Dry English, in 8-cwt. casks, £127 15s. per ton, Ground in oil, English, under two tons, £146 10s.

Lime Acetate.—Brown, ton lots, d/d, £18 to £20 per ton; grey, 80-82 per cent, ton lots, d/d, £22 to £25 per ton.

Litharge.—£119 10s. per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £27.

Magnesium Carbonate.—Light, commercial, d/d, £70 per ton.

Magnesium Chloride.—Solid (ex wharf), £20 to £25 per ton.

Magnesium Oxide.—Light, commercial, d/d, £160 per ton.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—Per lb., lump, 7s. 4d.; smaller quantities dearer.

Mercurous Chloride.—8s. to 9s. per lb., according to quantity.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methanol.—Pure synthetic, d/d, £28 to £38 per ton.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 3s. 7½d. per gal.; pyridinised 64° O.P. 100 gal., 3s. 8½d. per gal.

Nickel Sulphate.—F.o.r. works, 3s. 4d. per lb. (Nominal.)

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£128 to £133 per ton packed in free 5-cwt. casks.

Paraffin Wax.—From £61 10s. to £101 17s. 6d., according to grade for 1 ton lots.

Phosphoric Acid.—Technical (S.G. 1.500), ton lots, carriage paid, £61 per ton; B.P. (S.G.1.750), ton lots, carriage paid, 1s. 1d. per lb.

Phosphorus.—Red, 3s. per lb. d/d; yellow, 1s. 10d. per lb. d/d.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £76 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate. — Crystals and granular, 9¾d. per lb.; ground, 10¾d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £64 per ton for 1-ton lots, ex store; hydrated, £58 for 1-ton lots.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Chloride.—Industrial, 96 per cent, 6-ton lots, £16.10 per ton.

Potassium Iodide.—B.P., 11s. 1d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 7½d. per lb. for 1-cwt. lots; for 3 cwt. and upwards, 1s. 6d. per lb.; technical, £7 9s. 6d. to £8 3s. 0d. per cwt.; according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—Dog-tooth crystals, £72 10s per ton; medium, £67 10s. per ton; fine white crystals, £21 10s. to £22 10s. per ton, in casks.

Salicylic Acid.—MANCHESTER: 1s. 11d. to 3s per lb. d/d.

Soda Ash.—58° ex depôt or d/d, London station, £7 12s. 6d. to £8 7s. 6d. per ton.

Soda, Caustic. — Solid 76/77%; spot, £20 14s. per ton d/d.

Sodium Acetate.—£41-£55 per ton.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 8d. per lb.; anhydrous, 7½d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite. — Powder, 60/62%, £29 12s. 6d. per ton d/d in 2 ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

Sodium Chlorate.—£52 to £57 per ton.

Sodium Cyanide.—100 per cent basis, 8d. to 9d. per lb.

Sodium Fluoride.—D/d £4 10s. per cwt.

Sodium Hyposulphite. — Pea crystals £23 2s. 6d. a ton; commercial, 1-ton lots, £21 12s. 6d. per ton carriage paid. Packing free.

Sodium Iodide.—B.P., 10s. 2d. per lb. to 12s. 1d. according to quantity.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £101 10s. ton.

Sodium Metasilicate.—£19 to £19 5s. per ton, d/d U.K. in ton lots.

Sodium Nitrate.—Chilean Industrial, 97-98 per cent, 6-ton lots, d/d station, £20 10s. per ton.

Sodium Nitrite.—£29 10s. per ton.

Sodium Percarbonate.—12½% available oxygen, £7 16s. 9d. per cwt. in 1-cwt. drums.

Sodium Phosphate.—Per ton d/d for ton lots: Di-sodium, crystalline, £32 10s., anhydrous, £65; tri-sodium, crystalline, £32 10s., anhydrous, £62.

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Silicofluoride.—Ex store, nominal.

Sodium Sulphate (Glauber Salt).—£8 per ton d/d.

Sodium Sulphate (Salt Cake).—Unground, £6 per ton d/d station in bulk. MANCHESTER: £6 10s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £24 10s. per ton, d/d, in drums; broken, £25 5s. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £15 11s. 6d. to £17 16s. 6d. according to fineness.

Sulphuric Acid.—168° Tw., £6 2s. to £7 2s. per ton; 140° Tw., arsenic free £4 18s. 6d. per ton; 140° Tw., arsenious, £4 11s. per ton. Quotations naked at sellers' works.

Tartaric Acid.—Per cwt: 10 cwt. or more £8 10s.; 5 to 9 cwt. £8 12s.; 2 to 4 cwt. £8 14s.; 1 cwt. £8 16s.

Tin Oxide.—1-cwt. lots d/d £25 10s. (Nominal.)

Titanium Oxide.—Comm., ton lots, d/d, (56 lb. bags) £102 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d; white seal, £86 10s.; green seal, £85 10s.; red seal, £84.

Zinc Sulphate.—Nominal.

Rubber Chemicals

Antimony Sulphide.—Golden, 4s. to 5s. per lb. Crimson, 2s. 7½d. to 3s. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £11-£11 10s. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Bisulphide.—£37 to £41 per ton, according to quality, in free returnable drums.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£56 to £59 per ton, according to quantity.

Chromium Oxide.—Green, 2s. per lb.

India-rubber Substitutes.—White, 10 5/16d. to 1s. 5¾d. per lb.; dark, 10½d. to 1s. per lb.

Lithopone.—30%, £36 15s. per ton.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermillion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, in January £10 6s. 6d., rising by 1s. 6d. per ton per month to March, 1950.

Compound Fertilisers.—Per ton d/d farmer's nearest station, I.C.I. No. 1 grade, where available, £10 14s. 6d. I.C.I. Special No. 1, £16 1s., rising by 2s. 6d. per ton per month to June, 1950. National No. 2, £10 18s. per ton.

"Nitro-Chalk."—£10 4s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean for 6-ton lots d/d nearest station, £11 per ton.

Coal-Tar Products

Benzol.—Per gal. ex works: 90's, 2s. 6d.; pure, 2s. 8½d.; nitration grade, 2s. 10½d.

Carbolic Acid.—Crystals, 10¾d. to 1s. 0½d. per lb. Crude, 60's, 4s. 3d. MANCHESTER: Crystals, 10¾d. to 1s. 0½d. per lb., d/d crude, 4s. 3d., naked, at works.

Creosote.—Home trade, 6¼d. to 9¾d. per gal., according to quality, f.o.r. maker's works. MANCHESTER: 6¼d to 9¾d. per gal.

Cresylic Acid.—Pale, 98%, 3s. 9d per gal.; 99%, 3s. 1d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 3s. 11d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 10d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 4d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, ton lots, in sellers' bags, £8 1s. to £12 13s. per ton according to m.p.; hot-pressed, £14 15s. to £15 14s. per ton, in bulk ex works; purified crystals, £28 to £43 5s. per ton. Controlled prices.

Pitch.—Medium, soft, home trade, 100s. per ton f.o.r. suppliers' works; export trade, £6 to £7 per ton f.o.b. suppliers' port. MANCHESTER: £5 10s. f.o.r.

Pyridine.—90/140°, 22s. to 23s. per gal.; 90/160°, 21s. MANCHESTER: 19s. to 22s. 6d. per gal.

Toluol.—Pure, 3s. 2d. per gal.; 90's, 2s. 4d. per gal. MANCHESTER: Pure, 3s. 2¼d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 3¼d. to 3s. 6d. per gal., according to grade, d/d.

Wood Distillation Products

Calcium Acetate.—Brown, £15 per ton; grey, £22.

Methyl Acetone.—40/50%, £56 to £60 per ton.

Wood Creosote.—Unrefined, from 3s. 6d per gal., according to boiling range.

Wood Naphtha.—Miscible, 4s. 6d to 5s. 6d. per gal.; solvent, 5s. 6d. to 6s. 6d. per gal.

Wood Tar.—£6 to £10 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb.; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—1s. 2d. per lb.; P.G. 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10-cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON: January 23. The price of all refined oils and fats remains unchanged during the eight-week period ending February 25. The price of palm oil is now £99 per ton and Australasian inedible tallow ranges from £80-£102 10s. per ton according to grade. The prices of all other unrefined oils and fats remain unchanged during the five-week period ending February 4.

Chemical Supplies and Services

Dyestuffs Intermediates Jubilee

THE aniline dye and intermediate products manufacturing firm of John W. Leitch & Co., Ltd., Milnsbridge Chemical Works, Huddersfield, is this year celebrating its diamond jubilee. It was established by the late John W. Leitch in 1890 for the manufacture of coal tar derivatives forming bases for the preparation of aniline dyes and explosives and, in 1902, was one of the first makers of trinitrotoluol (TNT) in this country.

Following its experience in nitration processes, a natural expansion of the interests of this firm was in amines, diamines, nitro amino and amino azo compounds of all types, for use as dyestuffs intermediates and fast bases in the application of the insoluble azo colours to textile fibres. A method was introduced and patented for the application of azoic colours to wool. The firm was among the first manufacturers in this country of the equivalent of Hansa Yellows which formerly only Germany made.

Celebrating a Chlorine Record

A RECORD output of chlorine and chlorine products by the Cassel Works (B.C. Section), I.C.I., Billingham, was celebrated by a social attended by 90 employees in the Synthonia Club, Billingham. Congratulating the workers on their achievement, Mr. K. S. Jackson, deputy works manager, stressed the importance of chlorine production to the paper and steel trades and as a bleach.

Marine Paint Service

TO provide the shipping industry with a more efficient and economical paint service, the marine interests of three associated companies have been rationalised into one marine division under British Paints, Ltd., Royal Mail House, Leadenhall Street, London, E.C.3. The group incorporates the marine interests of the British Anti-Fouling Composition and Paint Co., Ltd., and J. & W. Wilson, Ltd. No change of directors or staff is contemplated.

This new marine division, which started operations on January 1, will be entirely responsible for the supply of marine paints in all home and overseas markets.

Improving Drying Oils

IMPORTANT improvements in the drying characteristics of natural drying oils, such as linseed and soya bean, are said to be conferred by a new American synthetic chemical, described as an "oil up-grader." The principle of this material, Dryene, is the introduction of conjugated unsaturation into the oil molecule. The resultant fast-drying oil, which develops carbon to carbon linkages, can be combined with phenolic resins to yield varnishes with high resistance to moisture and alkali. The use of the additive in an alkyd formulation is said to confer these and several other advantages, including greater toughness and durability. The time-saving factor is, however, one of the outstanding merits claimed by the U.S. Carbide and Carbon Chemicals Corporation, which is now producing the synthetic on pilot plant scale. The interest in the new material here is represented by General Metallurgical and Chemical, Ltd.

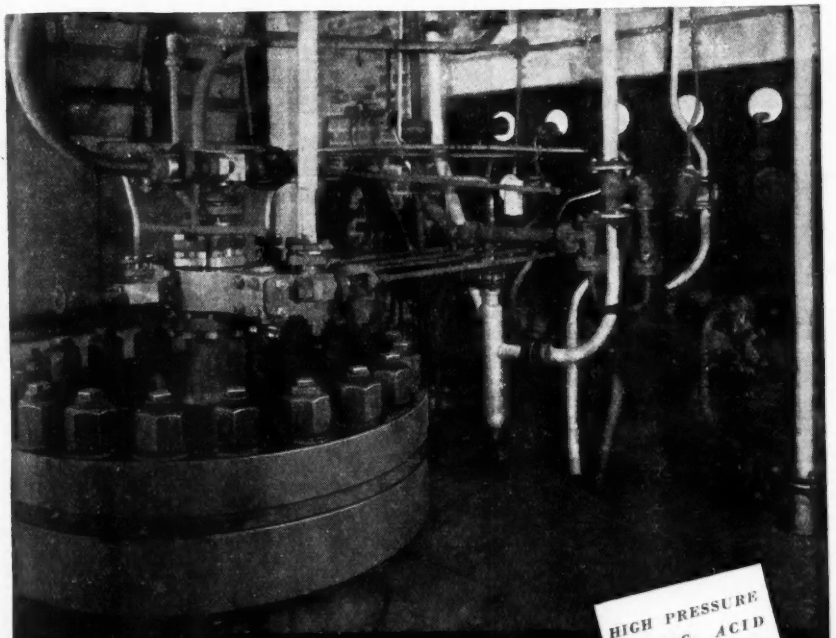
Chemical Engineers' Expansion

THE chemical engineering firm of Nordac, Ltd., whose works are at present located at Dukes Road, Western Avenue, London, W.3, is in process of moving into larger premises at Cowley Mill Road, Uxbridge, Middlesex. The move will be completed on February 1. The new works cover some three-and-a-half acres, providing increased accommodation for the construction of acid-resisting rubber-lined chemical vessels, in which the firm specialises, and for larger scale of research carried out for the industry.

In addition to the lining of plant and vessels "on the site," much work has been done by this firm on the development of chemical processes, including the treatment of spent pickle from steel works, fume removal from acid factories and special plant of all kinds. It is now developing a submerged flame burner for the concentration of acids and evaporation of all kinds of corrosive solutions.

Thioglycolic Acid for Austria

The Linz Nitrogen Works has recently taken up the manufacture of thioglycolic acid used in particular in the manufacture of certain dyestuffs. Output is reported to cover domestic needs.



modern high pressure plants for nitrogenous chemicals and fertilisers

BAMAG

LIMITED

COMPLETE CHEMICAL PLANT

RICKETT STREET, LONDON, S.W.6, ENGLAND

Telephone: FULham 7761 Telegrams: Bamag, Walgreen, London

Sales and Export Department:

UNIVERSAL HOUSE, 60 BUCKINGHAM PALACE ROAD, LONDON, S.W.1

SLOane 9282 Cables: Bamag, London

19/1

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

Great Possibilities for

QUALIFIED CHEMICAL ENGINEERS

VAST and far-reaching developments in the range of peacetime productions and markets of the Chemical Industry mean that the profession of Chemical Engineering will be of great importance in the future and one which will offer the ambitious man a career of outstanding interest and high status. The T.I.G.B. offers a first-class training to candidates for the Chemical Engineering profession.

Enrol with the T.I.G.B. for the A.M.I.Chem.E. Examinations in which home-study students of the T.I.G.B. have gained a record total of passes including—

FIVE "MACNAB" PASSES

and

FIVE FIRST PLACES

Write to-day for the "Engineers' Guide to Success"—free—containing the world's widest choice of Engineering courses—over 200—the Department of Chemical Technology, including Chemical Engineering Processes, Plant Construction Works Design and Operation, and Organisation and Management—and which alone gives the Regulations for A.M.I.Chem.E., A.M.I.Mech.E. A.M.I.E.E., C. & G., B.Sc., etc.

THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN

219 Temple Bar House, London, E.C.4

SITUATIONS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order

A **CHEMICAL ENGINEER** is required by Chemical Manufacturers in Mersey-side Area. Applicant should have had experience in plant layout and design, and should possess A.M.I.Chem.E. or an equivalent qualification. For the successful applicant the position is permanent and pensionable. Write, giving particulars of age, experience and qualifications, to Box No. C.A. 2897, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

ANGLO-AMERICAN COMPANY, producing cellulose for the Chemical and allied industries, require a **QUALIFIED PHYSICIST** for laboratory and process control work. Experience in our field not necessary. Age 20-25. Salary not less than £500. Applications, giving full details of education and qualifications, to **Chief Chemist, Holden -Vale Manufacturing Company Limited, Haslingden, Lancashire.**

ANGLO-AMERICAN COMPANY, producing cellulose for the Chemical and allied industries, require **TWO QUALIFIED CHEMISTS** for laboratory and process control work. Experience in our field not necessary. Age 20-25. Salary not less than £500. Applications, giving full details of education and qualifications, to **Chief Chemist, Holden Vale Manufacturing Company Limited. Haslingden, Lancashire.**

SITUATIONS VACANT

ASSISTANT CHEMIST or **TECHNOLOGIST** required in Research Laboratory of West Riding Engineering Textile Manufacturer developing new synthetic resin and rubber applications. Experience in these fields, together with personal initiative and some mechanical aptitude, are being sought. Salary according to experience and qualifications. Box No. C.A. 2894, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

BY-PRODUCT PLANT OPERATOR, with varied practical experience, required. Age over 25 years; must be educated but not necessarily of degree standard. Good salary for right applicant. Apply, in confidence, giving details of experience, to **THE CHEMICAL ENGINEERING & WILTON'S PATENT FURNACE COMPANY, LIMITED, The Old House, London Road, Horsham Sussex.**

CHIEF CHEMIST required by East Africa Industries, Nairobi, Kenya. Degree in Chemistry, together with several years' experience in research and plant operation necessary. Salary up to £1,200 per annum, less 10 per cent for rent; house hard furnishings provided. Progressive appointment carrying Superannuation. Agreement initially for three years. Leave with first-class passages paid each way for wife and family. Duties will be initially routine connected with organisation of Plant Laboratory, thereafter extended to development and new process research.

Write, giving full details of age, qualifications and experience, to PERSONNEL MANAGER, Colonial Development Corporation, 33, Dover Street, London, W.1, by 14th February, 1950, quoting Serial No. 87.

SCIENTIFIC GLASSBLOWER required for Manchester District. State age wage and experience. Box No. C.A.2891, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

WANTED, EXPERIENCED MANAGER with real engineering sales ability, to take charge of purchase and sales of new and secondhand Chemical Plant, Paint and Food Machinery, in established north-west concern. Salary with bonus can exceed £1,000 p.a. for the right man. Reply in confidence, giving previous experience, age and reference. Box. C.A. 2896, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

YOUNG ENGINEER, with interest in Chemical Engineering (Coal By-Product Section), required. Some practical experience an advantage. Matriculation standard desirable. Good salary with excellent prospects for energetic and ambitious young man. Apply to **THE CHEMICAL ENGINEERING & WILTON'S PATENT FURNACE COMPANY, LIMITED, The Old House, London Road, Horsham, Sussex.**

BUSINESS PREMISES

SUNDERLAND, County Durham, England. Chemical Works, complete with modern plant and buildings, all in excellent condition, available for early occupation. The total existing site measures 23,820 square yards. There is adjoining land available for extensions. First-class shipping facilities for ocean-going vessels are immediately adjacent. The works are rail and road connected. Very advantageous terms for suitable tenants. Early application advisable. Enquiries to the GENERAL MANAGER, River Wear Commissioners, St. Thomas Street, Sunderland, County Durham, England.

FOR SALE

600

PROCESS PLANT

8-IN. ROTARY VACUUM PUMP by **GENERAL ENGINEERING CO.** of Ratcliffe. Size, AV.110G. Cap., 1,126 cu. ft. per min. at 23 in. vacuum. Machine No. 1357. Direct coupled by flexible coupling to a 45 b.h.p. motor by Laurence Scott, 400/3/50, 585 r.p.m., with A.E.C. starter and isolator, automatic control panel giving visual indication. Unit complete with Foxborough control valve, gauges and connecting piping.

COMPLETE DISTILLED WATER PLANT, comprising six steam-heated Manesty stills, type No. 4, cap. 50 gal. per hr. each; one automatic loading tank; two direct motor-driven rotary pumps; vertical pressure storage tank of welded construction, suitable lagged, approx. 11 ft. deep by 5 ft. 6 in. diam., with raised manhole 2 ft. diam., with eighteen 1 in. diam. swing bolts for securing. Unit complete with all connecting piping, valve , etc.

M.S. ROTARY DRIER, drum 25ft. × 5 ft. I.D., with short screen at discharge end, fitted internally M.S. channel flights and two roller paths running in tandem rollers. Drive through girth wheel and pinion with counter-shaft and fast and loose pulleys. Heating by multi-bank gilled tubes.

TWO 100-BARREL CAP. M.S. GLASS-LINED TANKS, each 9 ft. diam. by 10 ft. high by ¾ in. plate, in four flanged bolted sections with dished bottom and domed top. Large manhole in bottom side, bottom centre outlet.

Twelve **80-BARREL CAP. M.S. GLASS-LINED TANKS,** 7 ft. 6 in. diam. by 10 ft. high by ¾ in. plate, bolted sections with dished bottom and domed top. Large manhole in bottom side, bottom centre outlet.

HORIZONTAL MIXER by **KRUPP,** 5 ft. by 5 ft. diam. by 5 ft. deep, fitted double "Z" mixing arms and having pump discharge, motorised 400/3/50.

VERTICAL MIXER by **BRIERLEY, COLLIER AND HARTLEY,** fitted stainless steel steam-jacketed pan 18 in. diam. by 10 in. deep, steam W.P., 15 lb. per sq. in., arranged with stainless steel spiral agitators, belt drive.

12 TROUGH MIXERS, by **HOISTING APPLIANCES,** with M.S. trough 14 in. diam. by 14 in. by 18 in. deep, fitted gate-type agitators, motorised 400/3/50, and fitted hand-tilting hinged cover.

GEORGE COHEN SONS & CO. LTD.,
SUNBEAM ROAD, LONDON, N.W.10,
Tel. Elgar 7222/7 and
STANNINGLEY, NR. LEEDS.
Tel. Pudsey 2241.

NEW STAINLESS STEEL PLANT
For all needs
REACTION VESSELS, STILLS, TANKS, BUCKETS, BOILING PANS, ROAD TANKS, ETC.
SPECIAL ATTENTION TO EXPORT

We specialise in finding unusual secondhand items for our customers. If you do not receive our monthly list, please let us have your address. May we help you? We are not dealers but only supply plant on commission.

R. F. PAGET,
Chemical and General Engineer,
MANOR HOUSE, BARWICK-IN-ELMET, LEEDS
Tel: Barwick-in-Elmet 216.

FOR SALE

VARIOUS MIXERS FOR SALE

No. 200 ONE nearly new **WERNER PFLEIDERER JACKETED MIXER OR INCORPORATOR.** Low type, with C.I. built mixing chamber, 28 in. by 29 in. by 27 in. deep, with double "U"-shaped bottom which is jacketed, and double fish-tail or fin-type agitators geared together at one side, with belt-driven friction pulleys, 34 in. diam. by 5 in. face, with hand-wheel operation and hand-operated screw tilting gear. Machine fitted with machine-cut gears, covers, gear guard, cast-iron baseplate, and measuring overall approximately 7 ft. by 6 ft. by 4 ft. high to the top of the tipping screw.

No. 201 One **DITTO.**
No. 202 One **DITTO.**
No. 203 One **DITTO.**

No. 204 One **WERNER PFLEIDERER MIXER OR INCORPORATOR,** similar to the above, with a C.I. built pan 25 in. by 25 in. by 19 in. deep, belt pulleys 26 in. diam. by 5 in. face, double fin-type agitators, and mounted on C.I. legs.

No. 205 One larger **WERNER-TYPE MIXER OR INCORPORATOR,** by Dobson & Barlow, with C.I. built pan or mixing chamber, of the double "U" type, 4 ft. 6 in. by 3 ft. 7 in. by 3 ft. 10 in. deep, with a jacketed bottom and sides to within about 12 in. of top, and fitted with double "Z" type agitators, counterbalanced cover, machine-cut gears at each side, steel back-frame with counterbalancing weights and self-contained belt-driven tipping gear and main triple fast and loose belt pulleys 30 in. diam. by 6½ in. face, with belt fork. Approximate overall sizes, 12 ft. long by 8 ft. wide by 10 ft. high.

No. 206 One **DITTO** of the same pattern, by **DOBSON & BARLOW.**

No. 207 One **DITTO** of the same pattern, by **DOBSON & BARLOW.**

No. 208 One **DITTO** by **WERNER PFLEIDERER,** with a C.I. built pan or mixing chamber, of the double "U" type, 4 ft. 5 in. long by 3 ft. 8 in. by 33 in. deep, with double "Z" mixing arms, gears at each end, hand-operated tilting gear, with steel backframe, counterbalancing weights and chains, and fast and loose pulleys 3 ft. diam. by 6 in. face.

No. 209 One **HORIZONTAL "U"-SHAPED MIXER,** steel built, riveted, measuring about 8 ft. 3 in. long by 3 ft. wide by 3ft. 3 in. deep, with horizontal shaft, fitted with bolted-on mixing arms about 18 in. long by 4 in. wide, with intermediate breakers, and driven at one end by a pair of spur gears, with countershaft, fast and loose belt pulleys, outer bearing and plug cock type outlet at the opposite end, mounted on two cradles fitted to two R.S.J. running from end to end.

No. 210 One **HORIZONTAL MIXER** as above.
No. 211 One **HORIZONTAL MIXER** as above.
No. 212 One **HORIZONTAL MIXER** as above.
No. 213 One **HORIZONTAL MIXER** as above.
No. 214 One **HORIZONTAL MIXER** as above.

These six "U"-shaped mixers are in some cases fitted with steel plate covers and a steam jacket round the bottom and extending to within about 18 in. of the top with plain end plates.

Further details and prices upon application.

Write RICHARD SIZER LIMITED, ENGINEERS, CUBER WORKS HULL.

COPPER JACKETED MIXER, by Roberts, 100 gallons ribbon blades, bottom outlet. Good condition. **AMES POLISH CO. LTD., Cheltenham.**

FOR SALE

BROADBENT 48-in. SUSPENDED TYPE HYDRO EXTRACTOR, overdriven from 15 h.p. motor 400/3/50 supply, together with Pony motor for slow running.

BROADBENT 48-in. HYDRO EXTRACTOR; three-point suspension, galvanised basket and complete with 15 h.p. motor, starting equipment and reverse current braking switch suitable for 400/440 volt 3-phase 50-cycle supply.

18-in. diam. WILKINSON OINTMENT MILL, with marble refining discs and enamelled hopper and agitator, and complete with driving motor.

TUNGSTONE ACID PUMPS. A number available in Ebonite, Bronze and Tufnol.

SILICA COILS of 2½ in. bore, comprising 60 ft. formed into seven turns at 2 ft. 6 in. diam., complete with teak supporting framework. (Brand new.).

NEWMAN INDUSTRIES LTD
Yate Bristol, England.
Chipping Sodbury 3311.

CHARCOAL, ANIMAL and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hilljones, Bochurch, London." Telephone: 3285 East.

CHEMICAL PLANT FOR IMMEDIATE DISPOSAL

30 Vertical **PRESSURE** or **VACUUM VESSELS,** 5 ft. 9 in. diam., 8 ft. high, dished ends, 75 lb. w.p.
16 horizontal, 5 ft. 7 in. diam., 8 ft. 6 in. long, 6 ft. 10 in. by 5 ft. 9 in. diam. **ALUMINIUM OPEN TOP TANKS.**
5 ft. 3 in. by 3 ft. 9 in. diam. **ENCLOSED ALUMINIUM TANKS.**
20 ft. 4 in. by 4 ft. by 2 ft. 8 in. **COPPER OPEN TOP,** 1,330 gallons.
Iwel **STEAM DRIVEN EXTRACTOR,** 60 lb. pressure.
Six **STEAM DISINFECTORS,** 7 ft. long, 3 ft. diam.
STEAM BOILERS—400 in stock, new and reconditioned.
also **AIR COMPRESSORS, MIXERS, REDUCTION GEARS, PIPES,** jacketed **STEAM PANS,** etc.
Send for illustrated catalogue containing 5,000 items—"Watkins Machinery Record."

FRED WATKINS, COLEFORD, GLOS.
'Phone: Coleford 2271/2

DISINFECTORS
2—5 ft. diam. by 8 ft. long, jacketed.
1—4 ft. diam. by 7 ft. long, jacketed.
6—3 ft. diam. by 7 ft., fitted coils.
2—50 in. diam. by 7 ft., jacketed.
Fitted double doors.
Condition as new.
THOMPSON & SON (MILLWALL) LIMITED
CUBA STREET, MILLWALL, E.14.

FOR Sale—All the **CONTENTS AND STOCK OF SMALL PAINT FACTORY,** including independently motorised Edge-runner, Triple and Single Roll Mills, Pug Mixers, High-speed Mixers, Spirit and Storage Tanks. Full details on application to Box. No. C.A. 2893, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

METAL Powders and Oxides. Dohm Limited, 167 Victoria Street, London, S.W.1.

ONE PELLETING MACHINE, Thompson & Capper. 1½ in. pellet, fast and loose pulley drive. Good condition. £100.
THOMPSON & SON (MILLWALL) LIMITED
CUBA STREET, MILLWALL, E.14.

1000 STRONG NEW WATERPROOF APRONS. To-day's value 5s. each, Clearing at 30s. dozen. Also large quantity Filter Cloths, cheap. Wilsons, Springfield Mills, Preston, Lancs. Phone 2198

FOR SALE

PRESSURE FILTER, 16 in. diam. by 40 in. high, with 50 filter plates and cloths.

TWIN "META" FILTER, capacity 3,000 gals. per hour.

"JOHNSON" FILTER PRESS, with 22 cast-iron recessed plates, each 26 in. diam.

"JOHNSON" ALL-METAL FILTER PRESS PUMP, two rams, 2½ in. diam. by 5 in. stroke.

"WEIR" FEED PUMP, 3,000 gals. per hour.

"MIRACLE" MILL. Chamber, 22 in. diam., with Cyclone and magnetic separator.

DARTNALL,
248, Humberstone Road, Plaistow, London, E.13

'PHONE 98 STAINES

STAINLESS STEEL JACKETED PAN (30 gallons) also W.S. and C.I. pans from 10-800 gallons.

DISINFECTORS, 8 ft. by 5 ft. diam. (Jacketed) 7 ft. by 3 ft. diam. (fitted copper coils). Large stock of rectangular and **CYLINDRICAL VACUUM OVENS** in stock.

"BROADBENT" 48-in. HYDRO. Self contained, 15 h.p., 400/3/50 (spare basket).

RUBBER MIXING ROLLS, 30 in. by 15 in. diam., water cooled (electric).

HARRY H. GARDAM & CO. LTD.
STAINES

STORAGE TANKS, ALL-WELDED TYPE.

2	Dish ended	22′	× 7′ 6″ diam.
1	,, ,,	19′	× 8′ diam.
3	Open top	9′	diam. × 8′ deep.
5	Flat ended	5′ 9″	diam. × 12′
2	Closed	20′	× 10′ × 10′
2	,,	10′ 6″	diam. × 13′
1	,,	7′	diam. × 6′
1	Dish ended	5′	diam. × 16′
1	,, ,,	10′	diam. × 7′ 6″
1	Open top	24′	× 9′ × 6′
1	Closed	14′	× 6′ × 4′
4	,,	10′	× 6′ × 4′
10	,,	6′	× 4′ × 4′

MADEN & McKEE, LTD.,
317, PRESCOT ROAD
LIVERPOOL, 13.

STORAGE TANKS, RIVETED TYPE.

1	Closed	12′	diam. × 8′
4	,,	8′	diam. × 30′
3	,,	7′ 6″	diam. × 28′
1	,,	10′	diam. × 28′
2	,,	7′	diam. × 26′
1	,,	5′	diam. × 20′

MADEN & McKEE, LTD.,
317, PRESCOT ROAD,
LIVERPOOL, 13

WELDED STORAGE TANKS.

9	Dish ended	8′ × 3′ 6″ diam.
20	Flat ended	6′ × 3′ 9″ diam.
10	Open top	3′ 9″ × 6′ diam.
1	,, ,,	6′ × 4′ 9″ diam.
1	,, ,,	10′ × 5′ × 5′
1	,, ,,	10′ × 4′ × 6′
1	,, ,,	6′ 6″ × 4′ × 5′ 6″
2	Dish ended	6′ × 3′ 6″ diam.

MADEN & McKEE, LTD.,
317, PRESCOT ROAD,
LIVERPOOL, 13.

20 First-class All-Welded Dish-ended **Steel STORAGE TANKS,** each 29 ft. by 10 ft. diam. Inspection by arrangement.

MADEN & McKEE LTD.,
317, PRESCOT ROAD,
LIVERPOOL, 13.

MISCELLANEOUS

WE ARE BUYERS of **SCRAP GRAPHITE** and **CARBON**, even from Moulds, Stoppers, Blocks, Raschig Rings, Filters, etc. Please write Box No. C.A. 2895, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

PATENTS & TRADE MARKS

KING'S PATENT AGENCY, LTD. (B. T. King, A.M.I.Mech.E., Patent Agent), 146a, Queen Victoria Street, London, E.C.4. ADVICE Handbook, and Consultation free. Phone: City 6161.

SERVICING

GRINDING, Drying, Screening and Grading of materials undertaken for the trade. Also Supplier of Ground Silica and Fillers, etc. JAMES KENT, LTD., Millers, Fenton, Staffordshire. Telegrams: Kenmill, Stoke-on-Trent. Telephone: 4253 and 4254, Stoke-on-Trent (2 lines).

GRINDING of every description of chemical and other materials for the trade with improved mills.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Hilljones, Bochurch, London." Telephone: 3285 East.

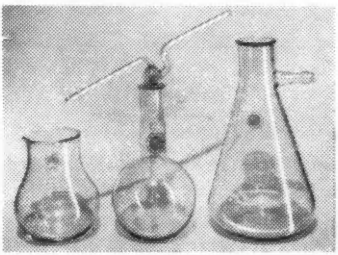
WORKING NOTICES

The Proprietor of British Patent No. 475041, entitled "**A process of treating material by heat,**" offers same for licence or otherwise to ensure practical working in Great Britain. **Inquiries to Singer, Stern & Carlberg, 28 E. Jackson Boulevard, Chicago 4, Illinois, U.S.A.**

THE Proprietor of British Patent No. 572514, entitled "**Improvements in hydraulic power transmission devices,**" offers same for licence or otherwise to ensure practical working in Great Britain. **Inquiries to Singer, Stern & Carlberg, 28, E. Jackson Boulevard, Chicago 4, Illinois, U.S.A.**

TRIBASIC PHOSPHATE OF SODA
Free Running White Powder
Price and sample on application to:
PERRY & HOPE, LIMITED, Nitshill, Glasgow

"LION BRAND"
METALS AND ALLOYS
MINERALS AND ORES
RUTILE, ILMENITE, ZIRCON,
MONAZITE, MANGANESE, Etc
BLACKWELL'S
METALLURGICAL WORKS LTD.
GARSTON, LIVERPOOL, 19
ESTABLISHED 1869



PYREX Brand
Scientific Glassware
gives the research worker:-

★ **Greater Chemical Durability**
It is highly resistant to all acids except hydrofluoric and glacial phosphoric.

★ **Greater Resistance to Temperature Changes**
A co-efficient of expansion of only 3·2 x 10-6 means that PYREX Brand Scientific Glassware is almost immune to breakage due to sudden changes of temperature.

★ **Greater Mechanical Strength**
Low co-efficient of expansion means that the walls of PYREX Brand laboratory equipment can be made thicker and more robust, giving greater resistance to the physical shocks of everyday handling.

★ **A Vessel for Every Purpose**
A range of glassware to meet every requirement of works routine tests, chemical research, and manufacturing processes.

PYREX Brand Scientific Glassware is supplied only through Laboratory Furnishers, but illustrated catalogue and two free copies of our Chemist's Notebook will be sent direct on application to us.

PYREX
REGD. TRADE MARK. BRAND.
Scientific Glassware
made by
James A. Jobling & Co. Ltd., Wear Glass Works, SUNDERLAND.
T 91 B

Products of the

Lennox Foundry Co. Ltd.

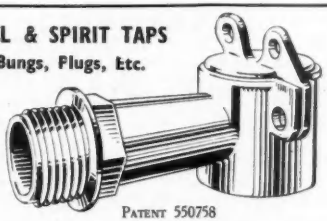
Include all alloys of Copper and aluminium, for the Chemical Industry.

Glenville Grove, London, S.E.8

Specialists in corrosion problems

OIL & SPIRIT TAPS

Bungs, Plugs, Etc.



PATENT 550758

(ILLUSTRATED LEAFLET ON REQUEST)

G. W. STEELE & CO., SCULCOATES, HULL

Empty Barrels & Drums

GENERAL AND EXPORT COOPERS AND DRUM RE-CONDITIONERS

T. H. FIELDING & SONS LTD.

KNOSTROP LANE, LEEDS 9

Phone : 22675 & 26394 Branch Works at Hull

LACTIC ACID

SULPHONATED OILS

TANNERS' MATERIALS

• • •

BOWMANS CHEMICALS, LTD

CHEMICAL MANUFACTURERS

Moss Bank Works : : : Near WIDNES

BELTING

AND

ENDLESS VEE ROPES

Superlative Quality

Large Stocks - Prompt Despatch

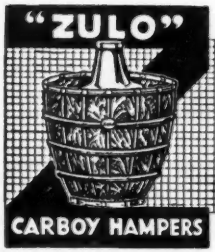
FRANCIS W. HARRIS & Co. Ltd.

BURSLEM - Stoke-on-Trent

'Phone : Stoke-on-Trent 87181-2

'Grams : Belting, Burslem

"ZULO"

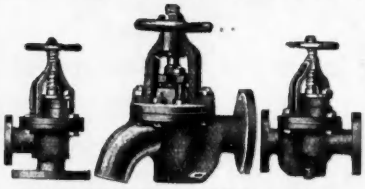


CARBOY HAMPERS

LEIGH & SONS METAL WORKS

Orlando St. BOLTON

YOU CANNOT BETTER HAUGHTON'S REGULUS ACID VALVES FOR ACIDS AND ACID LIQUORS



HAUGHTON'S METALLIC CO., LTD.

30, ST. MARY-AT-HILL, LONDON, E.C.3.

Phone: Cradley Heath 6537.

CHEMICAL CORROSION

Protection against acid and alkaline attack to all surfaces under severe conditions.

Tretol Ltd. 12-14 North End Road, London, N.W.11
Tel. Spe 4621

TRETOL
CHLORINATED RUBBER PAINT

IMMEDIATE DELIVERY

LEVER LOCKING DETACHABLE HEAD DRUMS

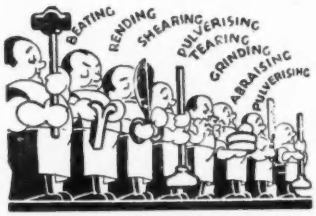
40/44 Gallon Capacity measuring 34½" × 22½"

Limited stocks

GEO.W. ORR & Co. Ltd.
8 COUSTONHOLM ROAD, GLASGOW, S.3.

Telegrams: Containers, Glasgow. Telephone: Langside, 1777.

THE PULMAC MILL



FOR REDUCING CHEMICALS TO THE FINEST POWDER or GRANULATION
MADE
IN FOUR SIZES

INTERNATIONAL PULVERISERS Ltd.
70, VICTORIA ST., LONDON, S.W.1.
Telephone—Victoria 2958.
Telegrams—Pulgrind, Sowest, London.

PIPERIDINE
COMMERCIAL
PYRIDINE FREE
LUPETIDINE

FULL DETAILS FROM ACTUAL MANUFACTURERS

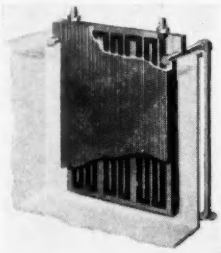
ROBINSON BROTHERS LTD
CHEMICAL MANUFACTURERS
RYDERS GREEN · WEST BROMWICH

Tel: West Bromwich 0080
HEAD OFFICE: OLDBURY · BIRMINGHAM

KARBATE

TRADE MARK

IMPERVIOUS GRAPHITE IMMERSION HEATERS



"Karbate" Plate Heater

"Karbate" Plate Heaters are designed for pickling tanks, plating tanks or other services where heating or cooling of corrosive liquids is required. These strong, durable, compact units are highly resistant to thermal and mechanical shock. Various sizes are made of standard component parts assembled to fit individual needs of the job.

CONSULT—

BRITISH ACHESON ELECTRODES LTD

GRANGE MILL LANE, WINCOBANK, SHEFFIELD

Telephone : Rotherham 4836 (3 lines) *Telegrams* Electrodes, Sheffield

---

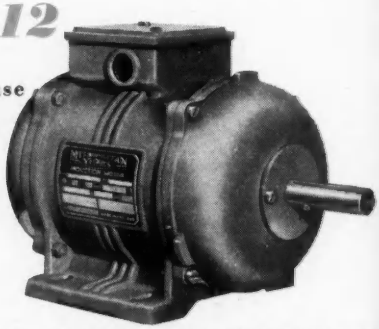
When good motors are needed urgently...

..ring

TRAFFORD PARK 2431

extension 1212

Our stocks of standard three phase SQUIRREL CAGE MOTORS — ¼ to 25hp.—are now being built up



METROPOLITAN-VICKERS ELECTRICAL CO. LTD. TRAFFORD PARK MANCHESTER 17

Printed in Great Britain by THE PRESS AT COOMBELANDS, Ltd., Addlestone, and published by BENN BROTHERS LTD., at Bouverie House, 154, Fleet Street, E.C.4, 28 January, 1950. Registered at the General Post Office. Entered as Second Class Matter at the New York, U.S.A., Post Office.

950

R 17

HERS
ffice.